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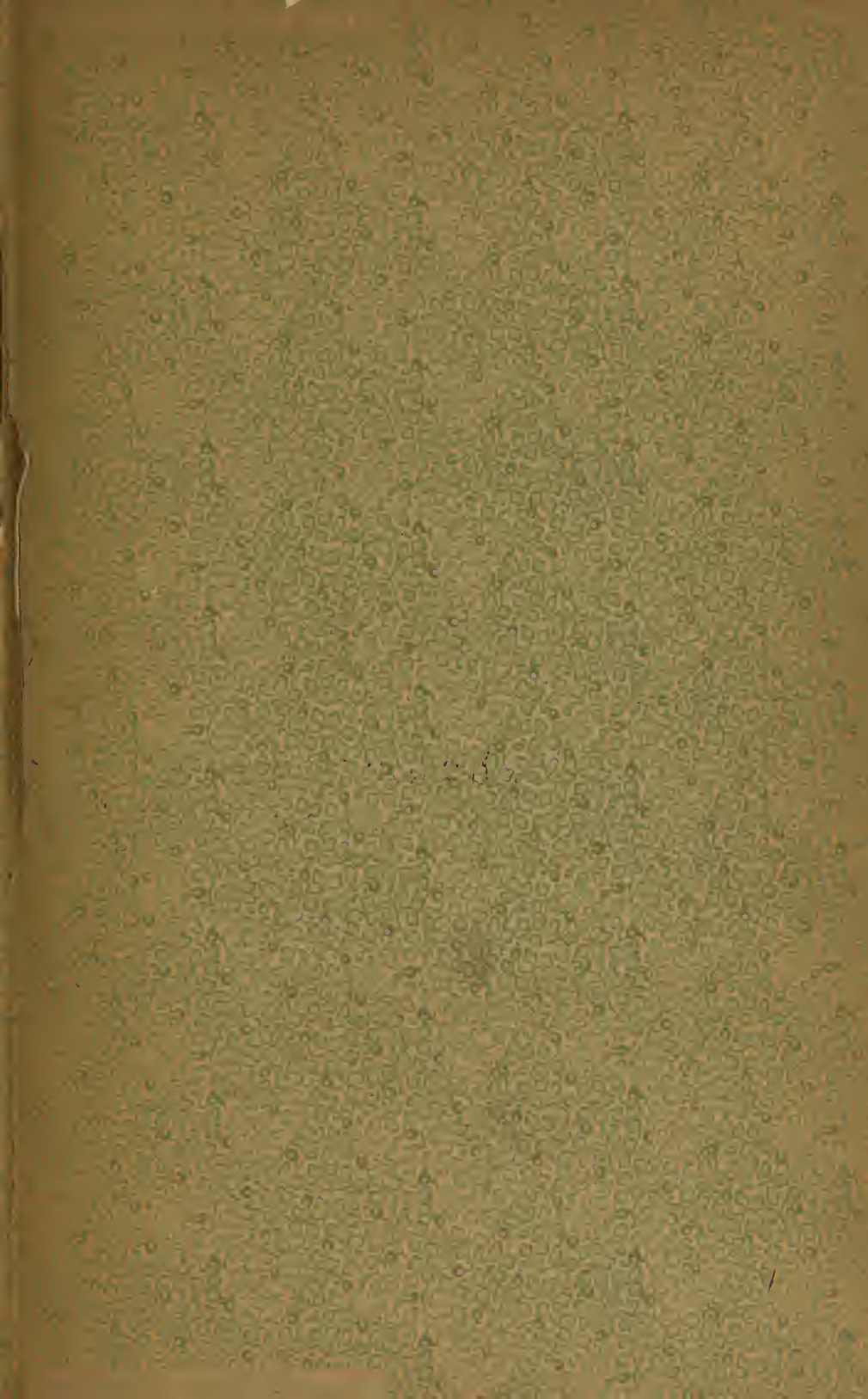
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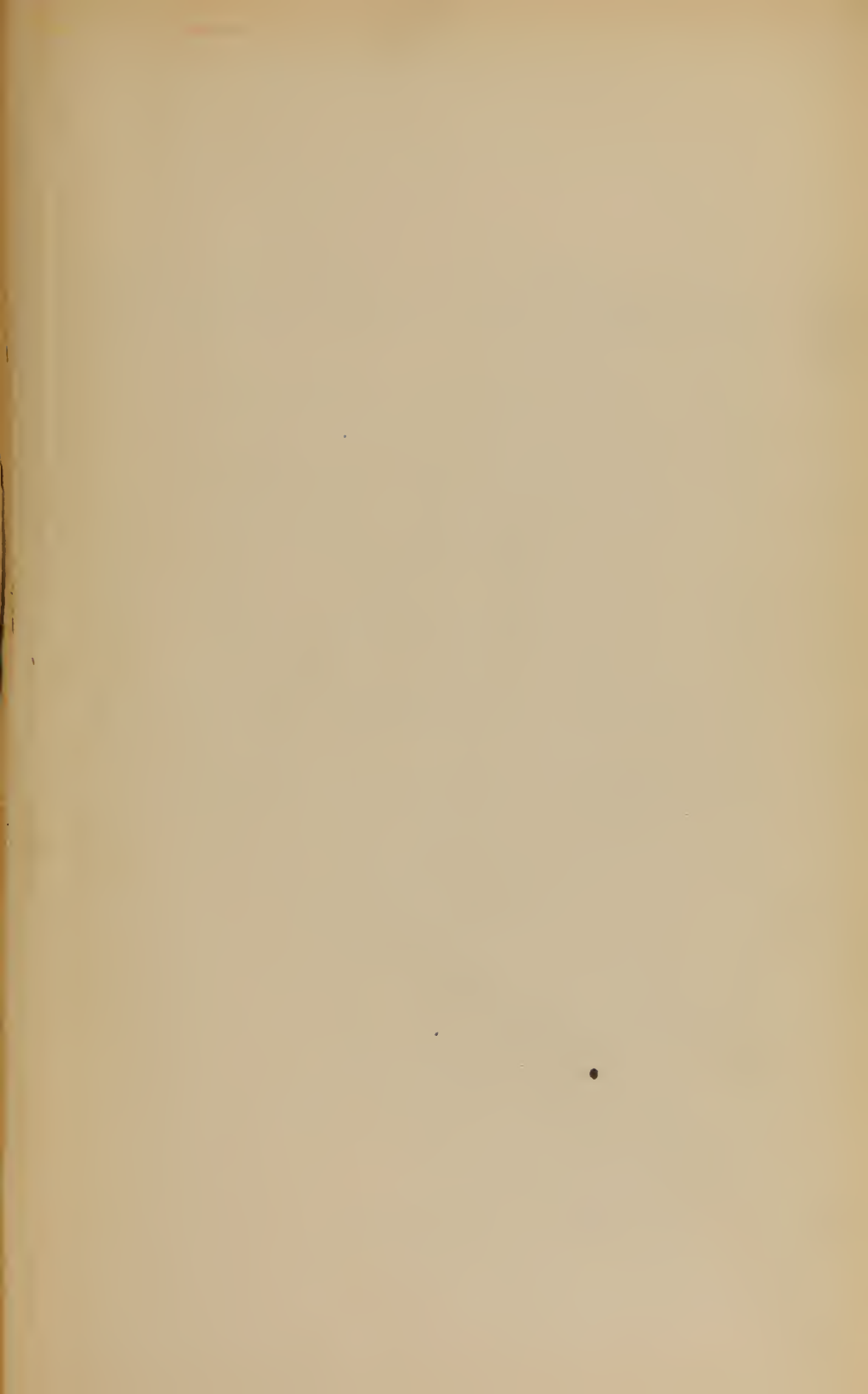
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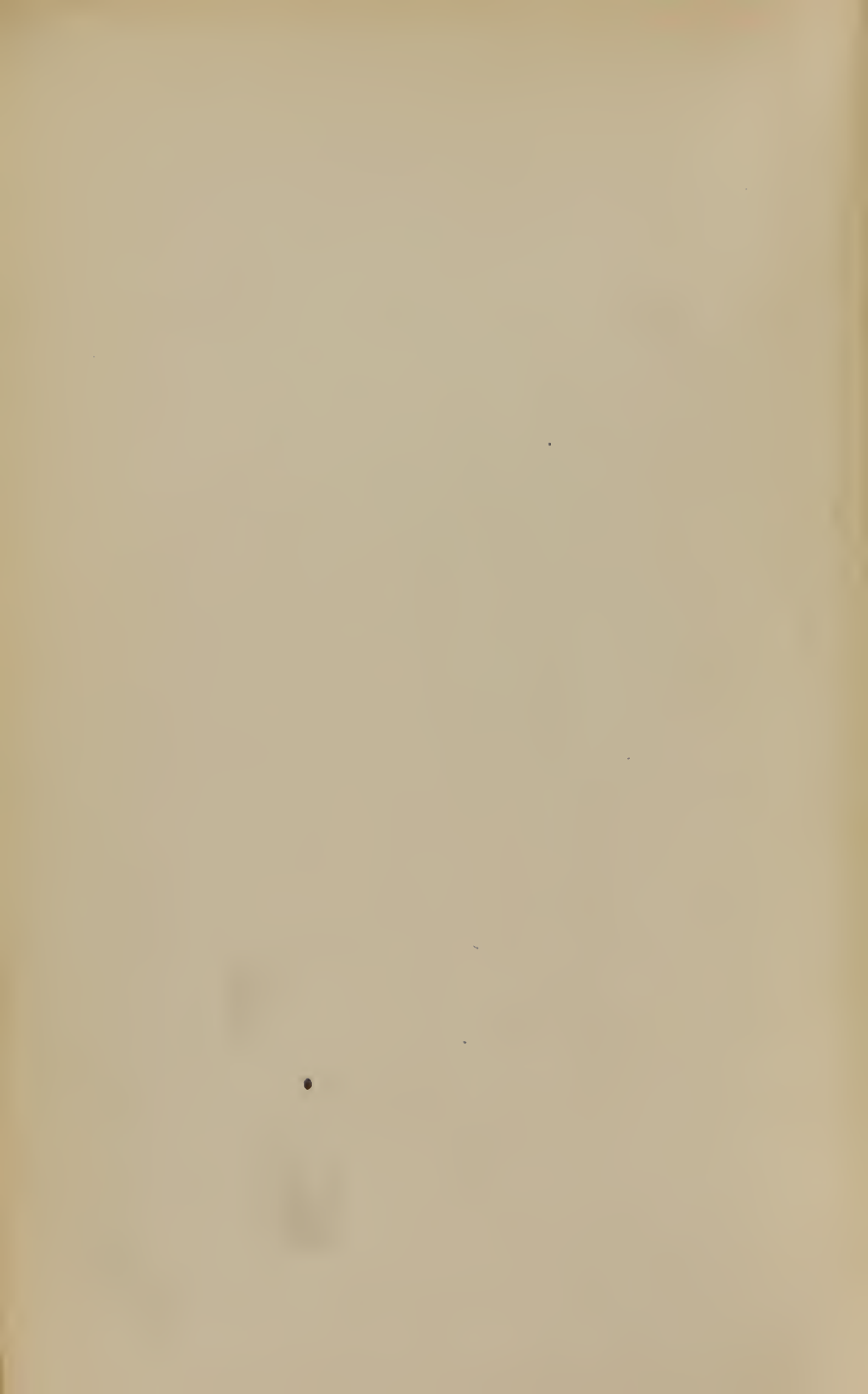
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# NOTES

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## Obstetrics, and Diseases of the Puerperal State:

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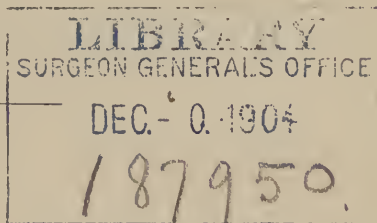
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FROM THE LECTURES OF

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and Gynecologists.



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## PREFACE.

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These notes have been prepared by me from the notes which I took in the class-room as a student, while attending the lectures on Obstetrics by Professor Tompkins of the Medical College of Virginia. The changes made in them have been with a view to putting the matter thus gathered in an orderly form. They are not intended as a contribution to the literature on the subject, but if they are of service to students in enabling them to have in a permanent form an outline of the lectures of Professor Tompkins, the writer will be satisfied.

CHAS. R. ROBINS, *M. D.*

I have read the manuscript of this work, and find that Doctor Robins has embraced in it essentially the Principles and Practice of Obstetrics as taught by me in my lectures at the Medical College of Virginia. I can therefore cordially recommend it to medical students.

CHRISTOPHER TOMPKINS, *M. D.*

## CHAPTER I.

### ANATOMY OF THE PELVIS.

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The pelvis is the bony girdle which rests upon the lower extremities and supports the spine. Its study is of the first importance, as a proper understanding of its formation and functions constitutes the alphabet and keystone of Obstetrical Science.

It serves the following important purposes:

It transmits the weight of the whole body.

The shock of a jump or fall is here broken up.

It presents roughnesses, depressions, and elevations for the attachment of important muscles and ligaments.

Within or attached to it are the organs of generation, which it to a certain extent shields and protects.

Through its canal the fœtus passes into the outer world, and the most serious difficulties in labor arise from its deformities.

The study of the pelvis embraces first, the *bones*, and second, the *pelvis covered by soft parts* as it is found in labor.

**The Bony Pelvis** in obstetrics is not the same as in anatomy, but includes besides the *two ossa innominata*, *sacrum*, and *coccyx*, the *last two lumbar vertebræ*.

THE OS INNOMINATUM is a large irregular bone which with its fellow of the opposite side forms the sides and anterior wall of the pelvic cavity. It is divided into *three parts for description*, the *ilium*, *ischium*, and *pubes*.

The *ilium* is the expanded broad portion which forms the prominence of the hip. Its internal surface is smooth and concave in front, and is called the iliac fossa. Behind it is rough for articulation with the sacrum. Its external surface is convex in front, concave behind, and presents three curved lines. To the spaces between these the *glutei* muscles are attached.

The superior border or crest is S shaped and thick, and serves for the attachment of the flat muscles of the abdomen. Its anterior and posterior borders both present a superior and an inferior spinous process with a notch between.

The *ischium* is also irregular in form, and is composed of a body, a spinous process, a tuberosity, and an ascending ramus. The spinous process, broad at its base and tapering to a point, projects from the body



backward and inward, and forms an eminence of such great importance that it is called the *key of the pelvis*. The tuberosity is the lower thickened part of the bone on which the body rests when in the sitting posture. The ascending ramus joins with the descending ramus of the pubes and assists in the formation of the obturator foramen.

The *pubes* are composed of a body which articulates with the body of its fellow of the opposite side, an horizontal and a descending ramus.

The Acetabulum is a deep cup-shaped depression, situated on the outer aspect of the bone at the juncture of the ilium, ischium, and pubes, and serves to receive the head of the thigh-bone or femur.

The Obturator or Thyroid Foramen is a large aperture situated between the ischium and pubes, is bounded by a thin uneven margin, and in the female is of triangular shape.

The *Sacrum* is a large triangular bone wedged in between the two innominate bones, thus completing the girdle, and articulating above at its base with the last lumbar vertebra, forming the promontory or sacro-vertebral angle, below at its apex with the coccyx. Its anterior surface is smooth and concave, and forms the greater part of the posterior wall of the pelvis. The posterior surface is rough and convex.

The *coccyx* is triangular in shape, flattened from before backward, and articulates at its base with the sacrum.

THE PELVIC JOINTS are the *sacro-vertebral*, *sacro-iliac*, *sacro-coccygeal*, and *pubic*. The joint between the fourth and fifth lumbar vertebræ is similar to that of the other vertebræ of its kind.

The *sacro-vertebral articulation* is likewise similar to that between other vertebræ; but the intervertebral disc is twice as thick in front as behind, making this articulation a very prominent point, which is of considerable obstetrical importance, and is known as the *sacro-vertebral angle* or *promontory of the sacrum*.

The movement permitted in this joint is similar to that between other vertebræ, and it has no special relation to pregnancy.

The *sacro-iliac articulation* is an amphiarthrodial joint, formed between the lateral surfaces of the sacrum and the posterior roughened part of the internal surface of the ilium. During adult life these surfaces are covered by cartilage, and the surfaces of the cartilages are roughened and separated from each other by a pulpy mass, but when pregnancy is developed these surfaces become smooth and lined by a delicate synovial membrane.

This joint is the strongest in the body, nature having made especial provision for the great strain induced by labor. This great strength is secured first by the shape of the bones. The sacrum being wedge-shaped, any force from above makes the joint more secure. Being also wider in front than behind above, and wider behind than in front below, displacement from before backwards is prevented. In addition, they are bound



firmly together by the following strong ligaments: Anterior sacro-iliac, posterior sacro-iliac, lumbo-sacral, ilio-lumbar, great sacro-sciatic, lesser sacro-sciatic.

*The sacro-sciatic ligaments* are of great importance.

*The great sacro-sciatic ligament* is attached at its base to the posterior inferior angle of the ilium, the fourth and fifth transverse tubercles of the sacrum, and to the lateral margin of the lower part of the sacrum and the coccyx. At first broad and thin, it becomes narrow and thick; but again expands, and is attached to the inner margin of the tuberosity of the ischium.

*The lesser sacro-sciatic ligament* is placed in front of the preceding, is triangular in shape and flat, and is attached by its base to the lateral margins of the sacrum and coccyx, and by its apex to the spine of the ischium.

When the head comes down in labor against the lower part of the sacrum and coccyx, the support given by these ligaments prevents them from being forced backward, thus tending to dislocate or strain the sacro-iliac joint.

*The pubic articulation* is an amphiarthrodial joint. Both surfaces of bone in adult life are covered by plates of fibro cartilage, which are connected together by elastic fibrous tissue, having a small synovial cavity left at the upper back part, which becomes larger in pregnancy, and may extend over the entire articulation. The ligaments holding these bones together are the anterior, posterior, superior, and inferior pubic.

*The sacro-coccygeal articulation* is an amphiarthrodial joint. Between the surfaces of these bones is interposed a fibro-cartilage which in pregnancy develops a synovial membrane, permitting great freedom of movement in the coccyx.

The ligaments are the anterior, posterior, and lateral sacro-coccygeal.

The movement in this joint adds materially to the antero-posterior diameter of the outlet, but the slight movement and swelling of the other joints in pregnancy is not to be regarded so much as being for the increase of pelvic diameters as for protection to the contents of the pelvis by breaking up the shock of falls and jars. After pregnancy has ended the synovial fluid disappears, and the pelvis returns to its fixed immovable condition. Sometimes this fluid is developed to such an extent as to seriously annoy the woman and interfere with locomotion.

**The Pelvis as a Whole** has somewhat of a funnel shape, the upper expanded portion corresponding to the false pelvis and the lower cylindrical portion corresponding to the true pelvis. It is, therefore, irregularly cone-shaped, with the apex cut off, making it a truncated cone. The apex of the true pelvis would occur twelve inches below.

Commencing with the anterior border of the base of the sacrum and extending along the lower border of the ilium and along the pubes almost



to the symphysis is a prominent ridge known as the *linea ilio pectinea*, which separates *the true* from *the false pelvis*.

THE FALSE PELVIS is that broad expanded portion of the pelvis above this line. It is basin-shaped, and formed posteriorly by the last two lumbar vertebræ, laterally by the venters of the ilii, and is incomplete in front, but this space is filled in by the abdominal muscles. This is of great obstetrical advantage, as it affords the child abundance of room; and the muscles being soft yield readily to the enlargement of the abdomen. The muscles also play an important part in expelling the child, especially in inertia of the womb, when it is the only force used by the woman. The false pelvis serves as a resting-place for the child during the latter part of pregnancy, and directs the child into the true pelvis when the woman is in labor.

The following measurements are of importance:

From the highest point of the iliac crest to the ilio-pectineal line,  $3\frac{1}{2}$  inches.

Between the anterior superior spines, 10 inches.

Between the anterior inferior spines, 9 inches.

The widest interval between the iliac crests, 11 inches.

These measurements are of course only approximate, but any considerable deviation from them would indicate pelvic deformity.

THE TRUE PELVIS is that portion of the pelvis below the ilio-pectineal line. It is formed in front by the bodies of the pubes, behind by the sacrum and coccyx, and on either side from before backwards by the horizontal and descending rami of the pubes, and ramus of the ischium, by the body, tuberosity, and spine of the ischium and by the sacro-sciatic ligaments.

It is a short curved canal, measuring in front at the symphysis  $1\frac{1}{2}$  inches, behind  $4\frac{1}{2}$  inches, and  $3\frac{1}{2}$  inches in the middle.

This is the bony canal through which the child must pass to get into the outer world, and its study is of great importance. It has an *inlet*, an *outlet*, and a *cavity*.

*The inlet* corresponds to the brim of the true pelvis, and is formed by the ilio-pectineal line.

*The outlet* is formed in front by the lower end of the symphysis, behind by the tip of the coccyx, and on either side by the tuberosity of the ischium.

*The cavity* of the pelvis is larger than either of its openings, and presents a slope that is marked, but not so great as that of the false pelvis.

Its general shape is round, but it is called also kidney and heart-shaped.

Looked at from above downward, the whole cavity appears to be divided by the spines of the ischia, which project inward prominently, into two segments, anterior and posterior. The line of division extends from a



point three-quarters of an inch in front of the sacro-iliac joint to the apex of the spines. The division is not equal. The anterior segment is the larger, and generally receives the head on its descent.

#### DIAMETERS OF THE PELVIS.

##### *Inlet:*

Antero-posterior diameter, 4.3–4.5 inches.

Transverse diameter, 5.3 inches.

Oblique diameter, 4.7–4.9 inches.

##### *Cavity:*

Diameter,  $4\frac{3}{4}$  inches.

##### *Outlet:*

Diameter, 4.3 inches.

These measurements have been selected after a careful study of those found in text-books on this subject.

*Inlet.*—The *antero-posterior* or *conjugate diameter* extends from the sacro-vertebral angle to the symphysis.

The *transverse diameter* extends across at the widest part.

The *oblique diameters* extend from one sacro-iliac symphysis to the ilio-pectineal eminence of the opposite side, and are named right or left, according to the sacro-iliac symphysis with which either connects. Instead of using a name, the diameter may be described anatomically. These diameters extend between immovable points of bone, and are fixed.

The *middle strait of the pelvic cavity* has an average diameter of  $4\frac{3}{4}$  inches.

The *antero-posterior diameter* extends from the middle of the symphysis to the base of the third bone of the sacrum, and is fixed.

The *transverse diameter* reaches from spine to spine of ischium, and is also fixed.

The *oblique diameters* connect the middle of each great sciatic foramen with the middle of the obturator foramen of the opposite side, and permit of a slight increase.

The *outlet of the pelvis* measures in each one of its diameters about 4.3 inches.

The *antero-posterior diameter* extends from the lower border of the symphysis to the tip of the coccyx, and can be increased one inch in labor by recession of the coccyx.

The *transverse diameter* extends between the tuberosities of the ischia, and is fixed.

The *oblique diameters* extend from the middle of the lower border of the sciatic ligaments on one side to the junction of the ischio-pubic rami on the other, and are consequently capable of some little extension.

THE STRAITS OF THE PELVIS are those narrowings observed at the inlet, outlet, and middle; and are named from their position *superior*, *inferior*, and *middle*.



The *superior* and *inferior straits* are identical with the *inlet* and *outlet*.

The *mid strait* starts in front half-way down the symphysis, skirts the top of the obturator foramen, passes along the plane surface of the ischium to the apex of the spine, and from thence to the base of the third bone of the sacrum.

The word plane is sometimes used in describing these narrowings, but the word strait is preferable, as otherwise they might be confounded with the inclined planes.

#### THE INCLINED PLANES.

A plane put through the pelvis in the median line in an antero-posterior direction divides its walls into two halves, called right and left. These walls present more or less flattened surfaces, and are further divided by obstetricians into two parts by a line passing from a point three-quarters of an inch anterior to the sacro-iliac joint on the ilio-pectineal line to the spine of the ischium, and are called, respectively, the anterior and posterior inclined planes.

There are thus four inclined planes, right anterior, left anterior, right posterior, left posterior; the anterior much longer and more extensive, and of greater importance in labor. Any object continuously impinging on the anterior planes is rotated under the arch of the pubes, while any object continuously impinging on the posterior planes is rotated into the hollow of the sacrum.

#### THE HORIZONTAL PLANES AND AXES OF THE PELVIS.

The *plane of the inlet* of the pelvis is a surface that would touch all the points of its circumference.

The *plane of the outlet* is a surface that would touch all points of its circumference at and below the level of the inferior part of the pubes. These planes, if continued in front, would soon meet. The axis of either one of these planes would be a line drawn perpendicular to it at its centre. If the axis of the inlet be extended in both directions it will strike the coccyx below, and just below or at the umbilicus above. The plane of the inlet is thus seen to be very oblique, while that of the outlet is nearly horizontal. Being separated behind by the length of the sacrum and coccyx, and in front only by the pubes, it follows that all planes of the pelvis must converge in front, and an imaginary line drawn to represent the axis of all the planes of the pelvis would describe a constant curve. This curve represents the *axis of the pelvis* or the *curve of Carus*, and marks the course taken by the fœtus at birth. It must be carefully studied and thoroughly understood and appreciated in order that the mechanism of labor and the use of the forceps, when necessary, be understood.

POSITION OF THE PELVIS.—In the erect posture the pelvis is seen to be placed obliquely as regards the trunk of the body, the plane of the



inlet or superior strait forming an angle of about sixty to sixty-five degrees with an horizontal line. The base of the sacrum is about four inches above the upper border of the symphysis, and the tip of the coccyx is a little more than half an inch above its lower border.

#### DIFFERENCES BETWEEN THE MALE AND FEMALE PELVIS.

There are certain differences that are well marked. In the male the *sacrum* presents a curve from above downward, the concavity being deepest in the middle. In the female it is straight above and curved below, the curve having very little depth. Young women should not stride a horse or bicycle, as it has a tendency to increase this curve, which might be a serious obstacle in delivery.

In the male the *obturator foramen* is smaller and oval in shape; in the female it is larger and triangular.

In the male the *sub pubic arch* represents an angle, and its edges are abrupt; in the female it is wider, forming more of an arch, and its edges are everted.

The *bones* of the female are lighter than those of the male, and do not present such marked roughness for the attachment of muscles.

The *wings of the ilia* in the female are more widely displayed, giving the woman broad hips, and the true pelvis being wide makes her knock-kneed, and often causes a waddling gait.

#### The Soft Parts of the Pelvis.

The bony pelvis just described is not the complete one found in labor, but is covered over by muscular and cellular tissue, furnishing the child a soft cushion, along which to travel, and protecting it from injury.

In the false pelvis are found on either side the iliacus and psoas muscles, on which the gravid uterus rests.

In the true pelvis the pyriformis muscles are found behind covering the sacrum, and in front the obturator muscles, both forming cushions and buffers, so to speak, with the interspaces filled in with cellular tissue.

Sweeping over these is the vagina.

These tissues narrow the diameters of the pelvis previously given one-eighth of an inch.

**FLOOR OF THE PELVIS.**—There are a great many muscles found here, but the *levator ani* is the one of principal interest to obstetricians. A knowledge of this is absolutely essential.

It arises in front from the posterior surface of the body and ramus of the pubes, behind from the spine of the ischium, and between these points from the obturator membrane, at the point where it joins with the recto-vesical fascia. From this origin the fibres descend toward the median line and are inserted into the walls of the vagina, the central tendon of the perineum, the sphincter ani, the raphe extending from the anus to the



coccyx, and the apex of the coccyx. These points of origin correspond to the mid strait of the pelvis. As the child comes down the perineum is distended. This muscle then serves to continue the inclined planes of the bony pelvis, and thus has a most important function.

This muscle gives strength to the floor of the pelvis and supports its contents. If, therefore, the perineum should become lacerated, it is necessary to bring the parts of the levator ani together in sewing it up. Otherwise the perineum would fail to perform its function of support to the organs of the pelvis, and the operation would be useless.

*The median line* is an imaginary line passing vertically through the centre of the body.

Toward this is called inward; from it, outward.

*The direction of a body* is ascertained by passing a line perpendicular to its surface.

*Inclination* is obtained by passing a line parallel to its surface.



## CHAPTER II.

### FEMALE ORGANS OF GENERATION.

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These are divided into *external* and *internal*, and include also the organs of lactation, the mammæ.

The **EXTERNAL** are the *mons veneris*, *labia majora*, *labia minora*, *clitoris*, *hymen*, and *orifice of the vagina*. These are also called, collectively, the *vulva* or *pudendum*.

The **INTERNAL** are the *vagina*, *uterus*, *ovaries*, and *Fallopian tubes* or *oviducts*.

THE **MONS VENERIS** is an eminence situated above the vulva and in front of the pubes, formed by a collection of adipose tissue beneath the integument. At puberty it becomes covered with a thick growth of hair, and contains a number of sebaceous follicles. Its function is to serve as a cushion or bumper in the act of coition.

THE **LABIA MAJORA** are the two prominent folds situated on either side of the vaginal orifice, extending from the mons veneris backward to within  $1\frac{1}{2}$  inches of the anus. The point at which they coalesce in front is called the anterior commissure, behind the posterior commissure.

Externally they are formed of integument, which at puberty becomes covered with a growth of hair, thicker anteriorly than posteriorly, and contains a number of sudoriparous and sebaceous glands. Internally they are formed of mucous membrane, and between these of adipose and connective tissue, together with vessels, nerves, and lymphatics.

The labia diminish in size from before backward, and in young nullipara generally lie in contact, but in those who have borne many children, and in the aged and emaciated, they become shrunken, and the labia minora project between them.

THE **LABIA MINORA** or **NYMPHÆ** are the two folds of mucous membrane, situated just outside of the vaginal orifice, which are exposed when the labia majora are separated. They commence at about the middle of the inner surface of the labia majora, and are narrow at first, but widen as they extend upward toward the clitoris. As they approach this organ each labium divides into two folds, the superior uniting to form the prepuce or hood of the clitoris, the inferior becoming attached to it and forming the frænum. Both the internal and external surfaces are formed of mucous membrane, which contains a very large number of sebaceous fol-



lices. Between these folds of mucous membrane is found connective and elastic tissue containing blood vessels. They contribute to the enlargement of the vulva orifice during parturition.

THE CLITORIS is the analogue of the male penis, and is situated below the anterior commissure, being covered by the labia minora in the manner already described. It is about an inch in length, and is formed by two corpora cavernosa, which, diverging behind into two crura, are attached to either ischio-pubic ramus. A suspensary ligament connects the body to the symphysis.

The anterior portion is rounded and highly sensitive, and is called the glans. There is no orifice in the clitoris.

THE VESTIBULE is a triangular space with its apex at the clitoris, its sides formed by the divergence of the labia minora, and its base by the orifice of the vagina. About  $\frac{1}{2}$  of an inch above the middle of the base of this triangle is situated the *meatus urinarius*. The margin of its orifice is puckered, forming a tubercle, and gives to the finger a sensation similar to that of the cartilages at the end of the nose.

INTRODUCTION OF THE CATHETER may be accomplished in two ways. One method is to bring the finger from above, separating the labia with two fingers of the left hand, down the vestibule in the middle line for four-fifths of an inch, when the tubercle of the orifice can be felt, and the catheter introduced. This method is objectionable, as it is liable to excite the clitoris.

Another is to bring the finger from below until the upper margin of the vagina is felt, which is the base of the vestibule. By slightly elevating the point of the catheter it can be introduced into the meatus. After a person becomes skilled he will be enabled to introduce the catheter by knowing the exact location of the meatus, without having to follow these guides. The soft-rubber catheter is the best to use. It should be held in the palm of the hand, with its tip resting on the forefinger for a guide, which, with the catheter, should be well oiled.

During pregnancy and distension of the bladder the location of the meatus is changed by the vagina being drawn up, and after difficult labor the parts sometimes become swollen and displaced forward, so that exposure is often necessary.

On either side of the meatus is a gland with a patulous mouth, which is sometimes mistaken by beginners for the meatus. The meatus can be told by being drawn into a pucker, while the mouths of the glands are smooth.

THE HYMEN is a thin membrane stretched across the vaginal orifice, generally having a semilunar shape, with the opening into the vagina situated above. It may, however, be circular, with the opening in the centre, or it may be cribriform, and occasionally it forms a complete septum, which condition is called *imperforate hymen*.



Generally after the first coitus the hymen is ruptured, its remains forming fleshy tubercles at the point where its circumference was attached, which are called the *carunculae myrtiformes*.

It sometimes happens that it is not ruptured by intercourse, and again that it is ruptured by some accident, or destroyed by inflammation and acid secretions, or by the introduction of an instrument, so that it cannot be looked upon as a positive test of virginity. It is always destroyed by ordinary labor.

The *Fourchette* is a transverse fold of membrane situated inside the posterior commissure, and is always ruptured in natural labor.

The *Fossa Navicularis* is a boat-shaped depression situated between it and the commissure.

THE VULVO-VAGINAL GLANDS or GLANDS OF BARTHOLIN are situated on each side of the commencement of the vagina, and empty by a long single duct. They are analogous to Cowper's glands in the male, and secrete a fluid which serves to lubricate the neighboring parts. They are sometimes the seat of inflammation and severe abscess.

THE VAGINA is a musculo-membranous canal extending in a curved direction from the vulva to the uterus. Above, this curve corresponds to the axis of the cavity, below to the axis of the outlet.

It serves as an organ of copulation, as a canal to convey the discharges and secretions from the uterus, and as a part of the birth canal.

It is situated between the bladder and the rectum. Its length is about 3 inches or more along its anterior wall, about 4 or 5 along its posterior.

It is in relation in front with the bladder above, the urethra below. Behind it is in relation for the upper four-fifths of an inch with the fold of peritoneum, which descends from the posterior wall of the uterus to the anterior wall of the rectum, and is known as Douglas' cul-de-sac. Below this it is in relation with the rectum, but as this curves backward, while the vagina curves forward, a triangular body is formed between the two with its base below and apex above. This is composed principally of fibrous tissue, and is called the "perineal body." When the perineum becomes stretched during labor this passes into it, furnishing additional material to provide for the stretching and to prevent laceration, this being its principal function. The base corresponds to the distance from the vagina to the anus, and is called the *perineum*. It measures nominally about 1 inch, but during labor stretches to  $4\frac{1}{2}$  or 5 inches. The narrowest part of the vagina is at its orifice, and it gradually widens as it approaches the uterus, where it turns back, and is attached to the cervix a short distance above the os, the attachment being higher posteriorly than anteriorly. Its mean diameter in the nullipara is from 1 to  $1\frac{1}{2}$  inches, in the multipara from  $2\frac{1}{4}$  to  $2\frac{1}{2}$  inches. In labor it becomes distended to such an extent that its diameters nearly equal those of the pelvis. It is composed of three coats, an external fibrous, middle muscular, and internal mucous.



The *mucous coat* presents a longitudinal ridge along the anterior and posterior walls, called the *columns of the vagina*, and numerous transverse ridges or *rugæ*.

THE UTERUS is the organ that receives the fecundated ovum, and retains and nourishes it until it becomes the fully developed fœtus at term, when it is the chief force concerned in its expulsion.

It is situated in the cavity of the pelvis between the bladder and rectum, its fundus reaching nearly to the plane of the inlet, and its cervix extending into the vagina, by which it is embraced in the manner already described. Its axis may be said to correspond to the axis of the inlet, thus forming an angle with the vagina, but it is an exceedingly mobile organ, rising and falling with each respiration, its axis changing as the surrounding organs become distended or emptied, and during pregnancy rising completely out of the cavity of the true pelvis and in that of the false. It has been described as pear and gourd-shaped, and presents near its middle a slight depression called the isthmus, which divides it into an upper broad portion and a lower cylindrical portion, called, respectively, the *body* and *neck*, or *corpus* and *cervix*. Its anterior surface is somewhat flattened, its posterior more convex.

The lower third of the cervix extends into the vagina, and in the virgin diminishes in size as it descends, the lower extremity being rounded, and containing an opening which is usually round. This is the *external os*. In the parous this portion of the cervix is not conical, but cylindrical, and the os is a transverse slit considerably larger, dividing the extremity of the cervix into an *anterior* and *posterior lip*.

In the virgin the uterus is about three inches in length, two in breadth, and one in thickness, and weighs from an ounce to an ounce and a half. During menstruation it becomes temporarily increased in size. It is larger in the parous than in the nulliparous, its weight being  $\frac{1}{4}$  to  $\frac{3}{4}$  greater.

It is held in position by two anterior ligaments, which pass from the cervix to the posterior surface of the bladder, two posterior, which pass from the sides of the uterus to the third and fourth bones of the sacrum, two lateral, called the broad ligaments, which pass from the sides of the uterus to the lateral walls of the pelvis, thus dividing the cavity of the pelvis into two portions, anterior and posterior.

In addition are the Round Ligaments, which commence at the superior angles of the uterus and pass out through the internal abdominal ring and along the inguinal canal to become lost in the labia majora.

The cavity of the uterus is divided by a narrow portion called the internal os, corresponding to the isthmus externally, into two portions.

That corresponding to the body is triangular in shape, its base being directed upward, and its superior angles being continuous with the orifice of the Fallopian tubes. This cavity is flattened, and its walls are in close contact.



In the nulliparous the sides of this triangle are convex with the curve toward the centre, in the parous the sides become straight or curved outward. The capacity of the uterine cavity in the nulliparous is from 30 to 50 minims, in the parous from 50 to 80 minims.

The *cavity of the cervix* is somewhat fusiform, flattened antero-posteriorly, and communicates below with the vagina. Its anterior and posterior walls in the virgin are marked by a longitudinal column, from which proceed in an oblique direction a number of smaller columns, called the *arbor vitæ*.

The *uterus* is composed of three coats, an external serous, a middle muscular, and an internal mucous. The serous coat is furnished by the peritoneum, which covers the whole of the posterior surface, the fundus, and the upper three-fourths of the anterior surface. The muscular coat forms the essential part of the organ, it being really a hollow muscle. It is composed of bundles of unstriped muscular fibres arranged in layers and intermixed with connective tissue, blood vessels, lymphatics, and nerves. It is thickest opposite the middle of the body and fundus, and thin at the orifice of the Fallopian tubes. In the unimpregnated state it is firm and dense, has a grayish color, and cuts like cartilage, but when the uterus becomes pregnant it becomes greatly hypertrophied, and is softened and red and like other muscular tissue.

The mucous membrane in the body is smooth, and lined by columnar ciliated epithelium, and when examined by a magnifying glass presents the orifices of numerous follicles, the utricular glands. The mucous membrane of the cervix is also provided with numerous glands, and lined by columnar ciliated epithelium. The arteries supplying the uterus present a very tortuous course, providing for the expansion of this organ during pregnancy. They are the ovarian, a branch of the aorta, and the uterine, a branch of the internal iliac. The uterine veins are large, and in pregnancy in some places where the placenta is attached become so increased in size as to be called sinuses.

The lymphatics are of large size in the impregnated uterus, and terminate in the pelvic and lumbar glands.

The nerves are derived from the inferior hypogastric and ovarian plexuses and from the third and fourth sacral nerves.

THE OVARIES are analagous to the testes in the male. They are two oval-shaped bodies, flattened from above downward, situated one on either side of the uterus, attached by their anterior margins to the posterior layer of the broad ligament, and by their proper or ovarian ligaments to the uterus. They are also attached by a short ligamentous cord to the fimbriated extremity of the Fallopian tube. Their long diameters extend in an almost vertical direction. They are about  $1\frac{1}{2}$  inches in length,  $\frac{3}{4}$  of an inch in breadth, and  $\frac{1}{3}$  of an inch thick, and have a whitish color.



The ovary consists of a number of Graafian vesicles imbedded in a stroma and invested by a layer of columnar epithelial cells.

THE FALLOPIAN TUBES are two in number, situated one on either side of the uterus, in the free margin of the broad ligament, their inner extremities being connected to the uterus, their outer being free and fimbriated. Each tube is about four inches in length, its canal being exceedingly small, and serving to convey the ovum from the ovary to the uterus. It has three coats, an outer serous, formed by the layer of the broad ligaments, a middle muscular having longitudinal and circular fibres, and an internal mucous which is thrown into longitudinal folds at its outer part, and is lined by ciliated columnar epithelium.

THE MAMMÆ are accessory organs of generation, furnishing milk for the nourishment of the infant. In the female they are two large hemispherical masses situated one on either antero-lateral aspect of the chest, extending from the third to the sixth, seventh, or eighth rib. Before puberty they are of small size, but enlarge with the other sexual organs at that time, and become fully developed with pregnancy. The nipple is situated just below the centre of the external surface, and is cylindrical or conical in shape; is dark in color, and surrounded by a dark areola, containing numerous sebaceous glands. The direction of the mammæ is downwards, forwards, and outwards, being thus easily accessible to the infant nursing in the arms.

They consist of glandular tissue, and are made up of numerous lobules arranged in lobes supported in connective tissue, and separated from each other by adipose tissue. These lobules open into ducts which unite to form larger, and finally end in a single canal, which forms the excretory duct of a lobe. There are from 15 to 20 of these lobes, and these ducts converge to the areola, under which they have a longitudinal dilatation which serves as a reservoir for the milk. Each duct opens by a separate contracted orifice at the end of the nipple.

In young women the breasts are firm and hemispherical in shape, but as they bear children they lose this firmness, and become pendant and flabby.



## CHAPTER III.

### GENERATION.

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**The Part Taken by the Male** consists in the deposit in the vagina during coitus of seminal fluid containing spermatozoa. These spermatozoa are developed from cells lining the seminiferous tubules in the testes, from which they pass to the vesiculæ seminales, whence they are ejaculated, together with other secretions from the testes, vasa deferentia, vesiculæ seminales, glands of the prostate, Cowper's glands, and the glands of the urethra, at the height of sexual intercourse. Spermatozoa do not generally develop in the male until about the fifteenth or sixteenth year, although there may be a discharge of fluid as early as the twelfth year.

**The Part Taken by the Female** is much more complicated.

**PUBERTY.**—The period at which the female becomes capable of procreating is call puberty, and commences generally about the thirteenth or fifteenth year. At this time the internal and external organs of generation become highly developed and vascular; hair appears on the mons veneris, the mammæ increase in size, the form takes on a more rounded appearance, and the menstrual discharge commences.

**OVULATION.**—The most marked of these changes taking place at puberty are in the ovaries, which become more vascular and develop and discharge ova.

*An ovum* is developed in the following manner: The columnar epithelium which covers the ovary is called the germ epithelium. Between these columnar cells are found other somewhat spherical cells, called the primordial ova. At different places the epithelium dips down into the ovary, forming tubes. These tubes contain the primordial ova, which are to develop into ova. The tubes become closed at the upper extremity and divided into numerous small rounded compartments, each of which develops into a *Graafian follicle*, containing one, sometimes two, ova. When one of these follicles is about to ripen it sinks down into the substance of the ovary, and enlarges by the accumulation of fluid. When it is about to burst it rises to the surface, becomes still larger, and finally bursts, discharging the ovum into the fimbriated extremity of the Fallopian tube, which embraces the ovary at this time.

**MENSTRUATION** is the name given the discharge of blood from the external genitals, which occurs in the normal mature female every 27½–28 days. It commences at the age of puberty, and ceases at some time



between the 40th and 50th year. The cessation of the menses marks the end of the procreative faculty, and is called the menopause or grand climacteric. The onset of menstruation is preceded by a feeling of congestion about the generative organs, tension about the uterus and ovaries, with sensitiveness to pressure, flushes of cold and heat, fatigue in the limbs, and generally digestive disturbances. The flow lasts from three to four days, during which time about four to six ounces are discharged. It is at first slimy, consisting principally of mucus, and then becomes bloody. Its color varies a good deal.

*The source of the flow* is chiefly from the mucous membrane of the uterus, which undergoes a fatty degeneration, and is excreted. This tears across the superficial vessels and causes the flow of blood. This process only affects the superficial layers of the mucous membrane, the deeper remaining and serving as the source of the new membrane which is developed.

(While the above is the view generally accepted, it is held by some that the fatty degeneration does not take place, and that the hemorrhage is caused by a diapedesis from the blood vessels without rupture.)

CONNECTION BETWEEN OVULATION AND MENSTRUATION.—This is a much disputed point, there being excellent authority for several theories. Only three will be given.

*Leopold* claims that menstruation is not dependent on ovulation, but occurs as a result of reflex action from the ovaries caused by continued growth of several ova.

*Reichert* claims that when an ovum is about to be discharged that a sympathetic change takes place in the mucous membrane of the uterus, it becoming more vascular, spongy, and swollen up, and thus in a proper condition to receive and nourish a fertilized ovum coming in contact with it. If, however, the ovum is not fertilized the membrane degenerates, and the flow occurs as already described.

*Auvard* claims that these two phenomena are independent of each other, but occur in obedience to some undiscovered law of the organism, and that one may occur without the other.

CORPUS LUTEUM.—When the ovum has been discharged in the manner already described, the Graafian follicle in which it was contained fills with blood, and its walls rapidly enlarge by the multiplication of its cells. These result in the formation of a body known as the Corpus Luteum.

If the ovulation does not result in a pregnancy the corpus luteum reaches its full development in about three weeks, and becomes reduced to a mere cicatrix in about two months. This is called the *false corpus luteum*. If, however, it does result in pregnancy the corpus luteum increases in size for 30 or 40 days. It remains stationary until the end of the sixth month, when it begins to lessen, and is about two-thirds of this size at term, and becomes a cicatrix in two to three months after delivery.



**FECUNDATION.**—This is brought about by the fertilization of the ovum by a spermatozoon passing into it. This may occur in the ovary or the Fallopian tube. The ovum when discharged by the bursting of the Graafian follicle is swept by the fluid into the Fallopian tube, where the action of the cilia carry it on downward to the uterus.

It consists at this time of a spherical cellular body called the vitellus or yelk, enclosed in an envelope, the zona pellucida. The vitellus contains a spherical nucleus, the germinal vesicle, which contains a nucleolus, the germinal spot.

It is about 1-120 of an inch in diameter.

Before the ovum becomes impregnated it undergoes some important changes. The germinal vesicle approaches the surface, and it with the germinal spot disappear, and in their place appears a spindle-shaped body, around which the granular elements of the vitellus arrange themselves, forming the nuclear spindle. One extremity of this, the peripheral pole, projects beyond the surface in the form of a nodule, which becomes globular, and finally separates from the ovum. The other pole then passes to the centre of the ovum and becomes the female pronucleus.

The spermatozoon consists of a head, body, and tail, the latter forming the greater part, being a long hair-like process. It passes into the uterus, probably by its own motion, although a certain suction is said to exist at the time of coitus.

From the cavity of the uterus it passes on into the Fallopian tube, where in the large majority of cases the union with the ovum takes place. This is accomplished by a spermatozoon penetrating the ovum and moving toward the female pronucleus. As it does so its head becomes surrounded with a star, and then the head and tail are lost, and the body only remains, which increases in size and becomes the male pronucleus. The female pronucleus then receives the male pronucleus in a depression on its side, and this union forms the new nucleus for the fecundated ovum. This is called the blastosphere, and from its segmentation all the cells to make up the new body are formed. The nucleus at first divides into two, and the yelk undergoing the same division makes two nucleated masses. These again divide in a similar manner, and this process continues until the whole yelk becomes divided into a number of small nucleated spheres, devoid of envelopes, which make the mulberry mass, or segmentation spheres.

*The blastoderm.*—While this process is going on the ovum increases in size by the absorption of fluid into its interior. The cells from pressure become polyhedral, and arrange themselves into a circular envelope composed of cells, and containing fluid. This layer of cells is called the blastoderm. The cells arrange themselves into two layers, the upper called the epiblast, the lower the hypoblast, while a third appears between them called the mesoblast.



The principal structures derived from these are as follows:

*From the epiblast* are formed the central nervous system and the external cuticle.

*From the hypoblast* are formed the intestinal epithelium and that of the glands opening into the intestine.

*From the mesoblast* are formed the vascular, muscular, and skeletal systems, and most of the organs of the body.

**The Origin of the Embryo.**—A small thickened disk develops at a part of the blastoderm, and is called the *area germinativa*. At this point the three layers are closely united, but for the balance of the circumference the layers remain distinct. At the posterior part of this appears a faint streak that is called the *primitive trace*. This gradually disappears as its place is taken up by the formation of the rudimentary spinal column. The cells of the epiblast heap up in two ridges in such a manner as to leave a groove between them that is called the *medullary groove*. These ridges continue to enlarge, and become two plates, the *laminæ dorsales*, or medullary plates, which finally become united and enclose the groove, which then becomes the *neural canal*. In this are developed the spinal cord and brain.

Just below the neural canal is developed the *notochord* or chorda dorsalis, and on either side a row of square segments, called the *provertebræ*. These are developed from the mesoblast, and that portion outside of these splits into two layers, the outer or upper called the *somatopleure*, the inner or lower called the *splanchnopleure*. From the former are formed the skeleton, muscles, and true skin, from the latter the muscular and other mesoblastic portions of the viscera. The space between them is the common pleuro-peritoneal cavity.

The embryo continues to grow, and as it does so becomes curved upon itself at both extremities, forming the cephalic and caudal flexures. The sides also grow and curve inward until they finally unite, enclosing the pleuro-peritoneal cavity.

The umbilical vesicle is the sac that includes the contents of the ovum. It is formed by the hypoblast and *splanchnopleure*, and probably serves at first as a source of nourishment for the fœtus. It, however, is atrophied by the fifth week, so its usefulness is of very short duration, but it remains visible until the fourth or fifth month.

**THE MEMBRANES INVESTING THE FŒTUS.**—These are the *amnion*, *chorion*, and the *decidua*. Of these the first two are developed from the fœtus, the last from the uterus.

**THE AMNION** is the membrane that lies originally just internal to the investing membrane of the ovum, and is composed of the epiblast and somatopleure. These are continuous with the embryo as has been stated, at the area germinativa. As the process of development goes on this mem-



brane pushes up at the extremities and sides, and at the same time insinuates itself behind the embryo, where the two processes meet and coalesce, the septum dividing them disappears, and the embryo becomes invested by a separate sac, called the true amnion, while the portion still remaining in relation to the vitelline membrane or investing membrane of the ovum is called the false amnion.

The true amnion gets to be called simply the amnion after the false amnion loses its identity by becoming united with other structures. It is at first closely applied to the embryo, but about the fourth or fifth week fluid begins to accumulate, distending the sac, and increases in amount until about the sixth month, after which it lessens somewhat. The cavity containing the fluid is called the amnionic cavity; the fluid, the liquor amnii.

THE CHORION is made up of two parts, one the vitelline membrane and false amnion, the other the allantois. The former two being in apposition combine, and from their external surface grow out processes which become hollow, and are called the chorionic villi. At first they have no vessels, and cover the whole surface, but as the placenta is about to be formed, which marks the point of attachment of the ovum to the uterine walls, the villi develop further only at this point, the rest remaining as simple projections. The allantois is developed from the splanchnopleure and hypoblast. It appears first as a hollow projection from the structure in the body of the embryo that is intended for the formation of the intestinal canal. It extends into the cavity between the true and false amnion until it reaches the portion of the chorion just described, when it spreads over its internal surface. In the meantime two arteries and two veins are developed, and when the allantois reaches the chorion branches from these enter into the chorionic villi, and finally form the foetal portion of the placenta.

THE DECIDUA.—While these changes have been going on in the ovum, important changes have taken place in the uterine mucous membrane. As has been described, this has become vascular and spongy before the ovum descends, and when it reaches the uterus, if impregnated, it lodges in the folds of the mucous membrane, which grows up around it, and finally completely invests it. That portion of the mucous membrane which in its altered, spongy condition lines the uterine cavity, is called the decidua vera, that which embraces the ovum, the decidua reflexa, that which is interposed between the ovum at the point of its attachment and the uterine wall, the decidua serotina. As the ovum increases in size the decidua reflexa becomes converted into a thin yellowish membrane, which constitutes the external envelope of the ovum.

The decidua serotina marks the site of the future placenta. The placenta is formed by the intimate union of the chorionic villi with the decidua



serotina. The large villi of the chorion develop only at the site of the decidua serotina into which they penetrate. The placenta is thus formed of a maternal and a foetal portion. In the maternal portion the vessels enlarge into sinuses, in which the villi float. Through the walls of the villi the interchange of fluids takes place that is necessary for the preservation of the life of the foetus, and the placenta thus serves in the place of an organ for respiration.

THE PLACENTA does not begin to be distinct until the third month, and becomes completed at the end of this month. The umbilical cord or funis umbilicatus is made up of two arteries and one vein united together by a gelatinous substance called Wharton's jelly. Originally there are two veins, but one becomes obliterated. It is invested by a layer of membrane derived from the amnion. The cord serves as a carrier of blood between the foetus and the placenta, the arteries carrying the expended blood from the foetus to the placenta, the vein carrying the freshened blood from the placenta to the foetus. It is formed from the pedicle of the allantois.

The nutrition of the foetus is derived probably at first for a short time from the umbilical vesicle, but its chief source until the formation of the placenta is from imbibition from the maternal tissues and absorption by the chorionic villi. From then up to term it is by the maintenance of the foetal circulation.

### Stages of Development.

FIRST WEEK.—Ovum in Fallopian tube undergoing segmentation, but growing very slowly. Reaches uterus about the end of this week.

SECOND WEEK.—Ovum increases in size rapidly and becomes completely imbedded in decidua reflexa. The amnion, allantois, and first rudiments of embryo are formed.

THIRD WEEK.—Flexures have taken place and embryo is strongly curved. Protovertebrae are formed. Primary divisions of brain and the primitive ocular and auditory vesicles appear. Alimentary canal presents a straight tube communicating with umbilical vesicle. Limbs have appeared as short buds. The primitive circulation is established.

FOURTH WEEK.—Umbilical vesicle has attained its full development. Upper and lower limbs project. Heart separates into right and left heart.

SECOND MONTH.—The side folds or visceral clefts completely close. The eyes appear as two black points, and the eyelids appear at the latter part of this or the first of the next month. The external ear appears as a slight projection. The body is less curved on account of the development of the viscera. The fingers and toes appear, but are webbed. The external genitals begin to form, but the sex is not differentiated.



At the end of this month the ovum is about the size of a hen's egg, the embryo measures one to one and a half inches in length, and weighs about one drachm. The umbilical cord about one inch in length.

THIRD MONTH.—Fingers and toes lose their web, and nails begin to develop. The eyes are nearer, the ears well formed, the walls of the body thicker.

The sex can be distinguished by the presence or absence of the uterus and vagina. Points of ossification are found in all parts of the vertebral column.

At the end of this month the ovum is about the size of a a goose's egg, and the embryo is 2.7 to 3.5 inches long, and weighs five drachms.

FOURTH MONTH.—The external genitals assume definite shape. A slight down-like growth of hair occurs on the body, and a few hairs appear on the head. Feeble movements occur in the limbs.

The fœtus at the end of this month is between six and seven inches long, and weighs nearly four ounces. The umbilical cord is seven and a half inches long. If the fœtus is born at this time it may live some hours.

FIFTH MONTH.—Hair on the head becomes distinct; vernix caseosa is present.

At the end of this month the fœtus is about ten inches in length, and weighs eight to nine ounces. The umbilical cord is about twelve inches. If born at this time the fœtus breathes, cries faintly, and lives longer than when born at four months.

SIXTH MONTH.—Growth of hair on head is plain; eyebrows can be faintly seen; vernix caseosa more abundant.

At the end of this month the fœtus is twelve and a quarter inches long, and weighs slightly more than a pound. If born it may live from one to fifteen days.

SEVENTH MONTH.—The eyelids are open; testicles descend nearly to the scrotum; nails almost completely formed.

At the end of this time the fœtus is thirteen to fifteen inches in length, and weighs between three and four pounds. If born it may live, but the majority of such children die. Some, however, that have been born as early as the sixth month have been raised by methods of incubation.

EIGHTH MONTH.—At the end of this month the fœtus is about sixteen inches in length, and weighs about five pounds. If born its chances for life are better than at seven months.



## CHAPTER IV.

### THE FOETUS AND ITS APPENDAGES AT TERM.

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**The Foetal Sac.**—The foetus at term is contained in a closed sac which has been formed by the union of the amnion, chorion, and decidua already described. The amnion enlarges by the accumulation of fluid, the liquor amnii, and finally invests the umbilical cord. It is continuous with the epidermis of the foetus.

**The Liquor Amnii** is the name given to the fluid contained in the foetal sac. The sac with this fluid is commonly called the bag of waters.

It is derived both from the mother and the foetus, and at term is composed largely of urine and other foetal excretions.

It is a clear alkaline fluid, having a specific gravity of about 1007, and containing some chlorides, phosphates, albumin, urea, and epithelium.

At term the amount is one to two pints, and may reach as much as four and a half or five pints.

Its uses are during gestation to prevent mechanical injury to the foetus or cord, to allow free movement of the foetus, and to furnish space for its development.

During labor it protects the foetus and cord from injurious pressure, assists greatly in the dilatation of the os, and lubricates the parturient canal after the rupture of the bag of waters.

During gestation it also furnishes water to the foetus.

**The Placenta** at term is a flattened mass composed principally of blood-vessels, and generally of an oval or round shape. It measures from six to eight inches in diameter, and is about one inch thick at the attachment of the cord, which is generally the central part.

Its average weight is one pound.

Occasionally there are lobes developed which are separate from the placenta, and are called *placentæ succenturiatæ*.

Its inner surface is smooth, and is lined by a continuation of the amnion and chorion. Its external surface is rough, and marked by fissures that divide it into lobes.

It is attached usually in the upper segment of the uterus either anteriorly or posteriorly, very rarely to the fundus.

**The Umbilical Cord** connects the foetus to the placenta, and contains two arteries and one vein for the transmission of blood from one to the other.



Its average length is about twenty inches, and it is about the size of the little finger, and twisted.

Its attachment to the placenta is usually near the centre, but it may occur near the margin, in which case it is called marginal insertion.

Occasionally the cord is attached to the membranes, in which the vessels run and divide before entering the substance of the placenta. This variety is called velamentous insertion.

**The Average Fœtus at Term** weighs about seven pounds, and is from about 19½ to 22 inches in length. It has for study the *head*, *upper part of the thorax*, and *pelvis*. The thorax is the largest, but can be compressed one inch, while the head is but slightly compressible, and is really largest to be born.

**THE FŒTAL HEAD.**—This is the part that usually passes through the parturient canal first, and if its delivery is accomplished the rest follows usually without difficulty. Its study, therefore, is of particular importance.

It is divided into *cranium* and *face*, the cranium including all bones above an imaginary line extending from the nasal eminence in front along the zygoma to the occipital protuberance behind.

The bones composing these differ in important respects. Those of the face are laid out in cartilage, and are therefore unyielding, but those of the cranium are laid out in membrane, and are therefore flexible, and can be compressed during labor, diminishing the diameters of the head. This is further aided by the fact that the bones can overlap each other, and are separated by membrane.

**SUTURES AND FONTANELLES.**—At birth the bones comprising the cranium are incompletely ossified, leaving spaces between them that are closed only by membrane. Where this space is between two margins of bone, and runs in a straight or curved line, it is called a suture; where it occurs at the juncture of several bones, and is open, it is called a fontanelle, from the fact that the integument there rises and falls with the beat of the heart. The existence of the fontanelles is due to the fact that when the child's head is being mapped out, the centre of ossification of the parietal bones is at the parietal bosses, and from this point the bones develop in a roundish way, leaving certain gaps. Thus in front and behind are two parts not covered in, which are given the names fontanelles. There is also one on either side of no obstetrical importance.

The fontanelles are of great importance as landmarks in diagnosing position in labor.

The most important sutures are the *sagittal*, extending over the vault of the skull in an antero-posterior direction from the root of the nose to the superior angle of the occipital bone; the *coronal* or fronto-parietal, situated between the frontal and the two parietal bones, and extending across the vault of the skull in a transverse direction from the squamous



portion of the temporal bone on one side to that on the other; the *lambdoidal* or *occipito-parietal*, situated between the occipital and parietal bones, and forming an angle, the apex of which corresponds to the posterior termination of the sagittal suture.

The most important fontanelles are the *anterior* and *posterior*.

The *anterior* is also called the *bregma*, is diamond or lozenge shaped, and situated at the intersection of the sagittal and coronal sutures. It is divided into two segments by the coronal suture, the anterior being the larger, and extending between the two incompletely ossified halves of the frontal bone. It does not completely close until about two and a half years.

It has been said that fissures and gaps occurring in the bones of the cranium, due to imperfect ossification, might be mistaken for sutures when felt by the finger in making an examination during labor. They can be easily differentiated by the fact that fissures and gaps have only one opening to them, while the sutures can be traced from one fontanelle to another.

The *posterior fontanelle* is situated at the junction of the sagittal with the lambdoidal suture, and is triangular in shape. It is quite small, and during labor is usually closed by the overlapping of the bones due to compression, but its position may be recognized by tracing the sutures leading to it.

In plates illustrating this subject this fontanelle is shown much larger than it actually is, which is apt to be misleading.

There are other fontanelles at the side that are of no special obstetrical importance.

#### DIAMETERS OF THE FŒTAL HEAD.

Occipito-mental . . . . .	5 inches.
Sagitto-mental . . . . .	4½ "
Occipito-frontal . . . . .	4 "
Cervico-bregmatic . . . . .	3½ "
Trachelo-bregmatic . . . . .	3½ "
Fronto mental . . . . .	3 "
Bi-parietal . . . . .	3½ "
Bi-temporal . . . . .	2½ "
Bi-malar . . . . .	2½ "
Bi-mastoid . . . . .	2 "

The *occipito-mental* extends from the angle of the occipital bone to the chin.

The *sagitto-mental* extends from the middle point of the sagittal suture to the chin.

The *occipito-frontal* extends from the angle of the occipital bone to the root of the nose.



The *cervico-bregmatic* extends from a point about midway between the foramen magnum and the occipital protuberance to the centre of the anterior fontanelle.

The *trachelo-bregmatic* extends from the anterior part of the neck, at a point corresponding to the larynx, to the centre of the anterior fontanelle.

The *fronto-mental* extends from the highest part of the forehead to the chin.

The *bi-parietal* extends between the parietal protuberances.

The *bi-temporal* extends between the origin of the coronal suture on either side.

The *bi-malar* extends between the malar bones.

The *bi-mastoid* extends between the mastoid processes.

#### DIAMETERS OF THE THORAX.

The obstetrical thorax includes the shoulders.

Bis-acromial diameter . . . . . 4 inches.

Dorso-sternal . . . . . 2 "

The *bis-acromial* extends between the apices of the two acromion processes, and can be compressed to 3 inches.

The *dorso-sternal* extends from the spinous process to the sternum.

The thorax has generally little to do in the mechanism of labor, because its diameters readily diminish on pressure. The pelvis of the child is so small, relatively speaking, that it passes without delay, the head and thorax having preceded it.

#### DIAMETERS OF THE PELVIS.

The pelvis is the smallest.

Bi-trochanteric diameter . . . . . 3 inches.

Antero-posterior . . . . . 3 "

The transverse or bi-trochanteric diameter includes the superior part of the femur, and extends between the two trochanters.

**SITUATION OF FORAMEN MAGNUM.**—This is an item of great importance in the mechanism of labor. It is situated nearer the posterior than the anterior extremity of the foetal skull, the two facets on either side of it articulating with facets on the atlas. When, therefore, the foetal head encounters resistance, the force from behind, pressing it onward, causes the chin to flex upon the thorax, thus making the smallest diameters engage. The greater the pressure from behind, the greater will be the disposition of the head to assume this favorable position.

The *obstetrical vertex* is different from the anatomical, and corresponds to a circle made by putting one leg of a compass in the posterior fontanelle and the other on the bregma and sweeping it around.



*Presentation* used in obstetrics means that part of the child found in the centre of the parturient canal. This does not mean the part most easily felt.

*Position* means the relation that the child bears to the mother. There may be many positions with only one presentation.

**The Fœtal Circulation.**—The peculiarities of the fœtal circulation require certain parts that become obliterated after birth. These are the foramen ovale, Eustachian valve, ductus arteriosus, ductus venosus, and hypogastric arteries.

THE FORAMEN OVALE is a foramen existing in the septum between the right and left auricles. It is nearly closed at birth, and usually becomes completely closed shortly after.

This foramen sometimes remains open after birth. Should this happen, the child will become blue, due to the blood escaping from the right to the left auricle, and thence being pumped through the system without being purified by the lungs. To prevent this happening, the child should be laid on its right side for the first day after being born.

THE EUSTACHIAN VALVE is situated in the right auricle in such a way as to direct the blood coming from the vena cava ascendens into the left auricle through the foramen ovale. It is practically obliterated at birth.

THE DUCTUS ARTERIOSUS appears as a continuation of the pulmonary artery, the two branches going to the lungs being very small. It empties into the aorta beyond the branches to the head and upper extremities. It becomes impervious at from the second to fourth day.

THE DUCTUS VENOSUS is a direct continuation of the umbilical vein, and empties into the vena cava ascendens. It becomes impervious at from the second to fourth day.

THE HYPOGASTRIC ARTERIES are branches of the internal iliac, and ascend along the sides of the bladder, and thence to the umbilicus and placenta.

That portion from the bladder to the umbilicus becomes impervious at from the second to fourth day. That from the internal iliac to the bladder remains, and is called the superior vesical artery.

The course of the blood is as follows: The principal portion of the blood descending in the aorta is conveyed through the hypogastric arteries to the placenta, where it becomes renewed by contact or osmosis with the mother's blood. It then returns to the fœtus through the umbilical vein where, after entering at the umbilicus and arriving at the liver, it divides into two portions, one part entering the liver, another portion going through the ductus venosus into the vena cava ascendens, where it mixes with the blood returned from the lower extremities, and receives by the hepatic veins that that has circulated through the liver.

This mixed blood, that is the purest obtained by the fœtus except that entering the liver, enters the right auricle, and is directed by the



Eustachian valve into the left auricle, whence it flows into the left ventricle. From here it is forced into the aorta. The vessels supplying the head and upper extremities receive this blood. The blood that is returned from the head and upper extremities enters the right auricle through the vena cava descendens, and passes through the auriculo-ventricular opening into the right ventricle. From here it is forced into the pulmonary artery, and a small portion goes to the lungs for their nutrition, but the greater portion passes through the ductus arteriosus into the aorta, where it joins the blood sent out by the left ventricle. This flows down the aorta, and is distributed to the remainder of the body by means of branches, a considerable portion being returned through the hypogastric arteries to the placenta in the manner described.

From this description it is seen that the best blood is received by the liver, the next best by the head and upper extremities. This is supposed to account for their greater development.

**Tying the Cord**—When the cord is tied only once it is not firmly held, and is liable to bleed. This is due to the fact that the gelatinous matter in the cord gradually slips from under the ligature, and thus may relieve the pressure. The cord should be tied with three ligatures in the following manner: After the cord has been stripped by the thumb and forefinger to remove as much of the gelatinous matter as possible without doing detriment to its integrity, the first ligature is applied about two inches from the child. Another is then applied just beyond this. This strengthens the other ligature, and holds the gelatinous matter firm and prevents its slipping. The third ligature is applied toward the placenta, leaving sufficient space between it and the second ligature to provide two good stumps when the cord is severed at this point. The ligature toward the placenta is used so that, should there be twins, the child not delivered will run no risk of bleeding to death.

### **Attitude of the Fœtus in the Womb.**

It is a commonly observed fact that generally (95 cases in 100) the fœtus rests with its head at the neck of the womb and its breech at the fundus. Many reasons have been given to account for this. Some have thought it due to instinct in the child, and have given as an illustration the instinctive endeavors of the child to suckle as soon as it is born.

Some have thought it due to the cord being attached to the child at a point further from the head than the feet, and have claimed that the child was suspended in the uterus by the cord, in which case the head would naturally fall below, owing to the greater weight of the parts of the body on that side of the cord.

Some have thought that the fœtus assumed this position as a matter of choice.



Still others have thought it due to the movements of the child which adjusted itself to that position that was most comfortable.

Gravity has been given as a reason, and it has been shown by experiment that if a fœtus is put in a pail of water made of the same specific gravity as the amniotic fluid that it will float with its head down.

It has also been observed that women who have departed from the upright position by lying abed for very considerable lengths of time are less apt to have a head presentation.

*The form of the uterine cavity and of the fœtus* is the chief reason. When the fœtus is in its natural intra-uterine attitude, with its legs doubled up on its body, and its arms folded, the breech is the largest part of the body, and the head the smallest. The uterine cavity is smaller below and larger above. There is, therefore, a pear-shaped body in a pear-shaped cavity, and the alternate contractions and relaxations of the uterus gradually work the fœtus around until it assumes that position where it fits best, and which is with its head down.

The best reasons for the normal attitude of the fœtus are gravity and the form of the uterus and fœtus. The movements of the child probably aid it in assuming this position.



## CHAPTER V.

### CHANGES IN MATERNAL ORGANISM INCIDENT TO PREGNANCY.

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**The Vagina.**—After the uterus has become so enlarged that it is lifted out of the pelvis, the vagina is put very much on the stretch and lengthened. This stretching causes the rugæ to disappear. In some cases the stretching is so great that the vagina is peeled off from its upper attachment to the cervix, leaving it attached only to its lips. This is usually remedied after labor by nature, but is sometimes permanent.

*The color of the vagina* is also changed to a purplish or violet hue, due to the congestion of the parts caused by the uterus pressing on the return veins.

**The Bladder.**—This organ is pushed up by the uterus as it ascends. It often happens that the water has to be withdrawn, but owing to the displacement of the bladder, the ordinary female catheter is often inadequate for this purpose. It should be longer and with a greater curve. The ordinary soft catheter is the best one to use, as it is less liable to injure the parts, and is long enough to reach the bladder.

**The Hymen** is with few exceptions absent. It sometimes happens, however, that it is of such a dense character that it has not been ruptured by coitus, and remains intact up to the time of delivery. In such cases it must be divided.

**The Perineum** becomes somewhat hypertrophied, and is gradually prepared for the great distention it will undergo during labor.

**The Ovaries.**—In the non-pregnant state the ovaries are found full of Graafian vesicles, which burst at regular intervals, and let the contained ova escape. If the ovum becomes impregnated, the corpus luteum becomes considerably enlarged, and remains so for a long time, as previously described; if the ovum does not become impregnated, the corpus luteum shrivels up.

**The Uterus.**—This organ undergoes the most important changes that occur incident to pregnancy.

**WEIGHT.**—In the virgin it weighs normally about one and one-half ounces, and if the woman has borne children, about two ounces. In pregnancy, its weight increases enormously, and after voiding its contents at term, reaches two to three pounds. After delivery it returns to nearly its former size, but never gets quite so small again as



it was before pregnancy. This process is called involution. For the first nine days it takes place quite rapidly, the uterus by this time being reduced to about twelve ounces. During this period the woman must remain quietly in bed, as any attempt to get on her feet or move about may arrest the process, and the uterus may remain abnormally large. This condition is known as subinvolution. When a woman gets up after confinement, it should be done gradually; the first day sitting up in bed for a short while, and gradually increasing until she is able to walk around. Involution is not fully completed until six or eight weeks. During this time it is important not to have coition, as it also is liable to cause subinvolution.

**SIZE.**—In the non-pregnant woman the uterus measures about three inches long, two wide, and one and one-half thick. At term it has increased to twelve to fifteen inches in length, nine to ten in width, and six to eight in thickness.

**CAVITY.**—From a capacity of a few minims in the non-pregnant uterus to half drachm when distended, it becomes capable of holding the mature foetus, having a capacity of about 500 cubic inches. The cavity grows most from the body, the neck remaining till about the time of confinement undisturbed.

**THE CERVIX.**—In the virgin the cervix is cone-shaped, in the parous cylindrical. The os in the virgin is round, and in the parous oblong and irregular, the long diameter being in the transverse direction. This is due to the fact that the head is born in such a way that it makes small tears most at the sides. These tears made during parturition and healing afterwards, give the os its irregular outline.

When a woman becomes pregnant, the uterus loses its rigid fibrous character and becomes soft, so that the child in the uterus can be outlined by pressing on the abdomen. The cervix also softens, but this process commences below at the external os, and advances gradually toward the internal os, which remains hard until pregnancy is completed. This softening gives to the cervix a velvety feel, as if a piece of velvet were placed over a hard substance. At the end of three months the softening has extended up the cervix a line (one-twelfth inch) to a line and a half; at the end of six months, half way, and at the end of nine months the whole cervix has become soft.

This softening of the body and cervix gives rise to several very important signs of pregnancy.

**HEGAR'S SIGN** is softening and thinning of that part of the uterus immediately above the cervix. It is best ascertained by inserting the forefinger in the rectum, while the thumb is passed into the vagina anterior to the cervix, when that portion of the uterus can be made to roll between the thumb and finger like a piece of very soft rubber tubing,



and can be flattened out like a piece of paper. Other methods can be used. The uterus should be pushed down by the other hand on the abdomen so as to be more easily grasped.

*Another sign* is gotten by placing the finger against the body just behind the cervix, when the uterus will not only be found to be soft, but the fluid which it contains can be palpated.

**SHORTENING OF THE CERVIX.**—It has been a matter of dispute for about 200 years whether or not the cervix becomes shortened during pregnancy. It is now, however, well established that this shortening is only apparent, and is due to the cervix being drawn up by the ascent of the uterus.

Shortening of the cervix does occur, but only a short while preceding labor, from a few days to a few hours, and is due to the now entirely softened cervix being taken up by the uterus.

**ASCENT OF THE UTERUS.**—During pregnancy the uterus arises on account of the obliquity of the pelvic walls. The uterus and the pelvic cavity are both cone-shaped, the one fitting into the other, and as the uterus enlarges it causes itself to gradually rise.

This ascent affords a means of ascertaining the *advancement of pregnancy*. At the end of four months the fundus has arisen a little more than to the brim of the pelvis, at the end of five months a little more than to half way between the brim and the umbilicus, and at the end of six months to a little more than the umbilicus, at the end of seven months to a little more than half way between the umbilicus and the ensiform appendix, at the end of eight months to the ensiform appendix. During the first part of the ninth month it remains stationary, and toward the latter part it commences to settle down.

*The wall of the pregnant uterus* varies from  $\frac{1}{4}$  to 1-16 of an inch in thickness, and is much thicker at the insertion of the Placenta. As the uterus grows it inclines to one side, usually the right, especially with primipara.

*The muscles* are non striated, and contract involuntarily. The alternate contraction and relaxation takes place all during pregnancy, and is a sign. These contractions are generally painless, but during the latter part of pregnancy they sometimes become quite painful, and constitute what are known as false labor pains. They also may continue after delivery, and often cause so much suffering that it becomes necessary to administer medicine to afford relief. They help expel whatever may tend to lodge and remain in the uterus.

**MILK** appears in the breasts usually about the sixth week of pregnancy. All women are not capable of giving milk, and this is independent of their mammary development.

An intimate relation exists always between the breasts and the uterus. The onset of menstruation is often accompanied by painful mammæ.



A mother is usually able to nurse her infant for eight or nine months, during which time she does not menstruate. There is every reason why a mother should nurse her child. With such women the uterus undergoes a more perfect involution, a warmer love for their offspring is nurtured, and pregnancy does not occur again so soon, while the health of the children is greatly promoted, for of bottle-fed children three out of four die; of breast-fed, three out of four live.

The child should be nursed every few hours.

THE AREOLÆ.—The breasts have an areola around the nipple, which in the blondes is light pink, and darker in the brunette. The nipple is somewhat darker than the areola. Situated in this areola are about twelve to twenty sebaceous glands. When a woman becomes pregnant this areola commences to darken, and the sebaceous glands become more prominent, projecting from a sixteenth to an eighth of an inch. This change in color is more apparent in the blonde than the brunette, and increases until the woman is about to be delivered.

A great difficulty in using this sign is that each woman has a color of her own, so that there is no standard by which to judge of a change. Women, however, usually notice the change themselves, so they can be asked; but as in many cases where signs are of most importance, the woman is not truthful, this sign is often of no value.

This areola has a radius of about one inch.

At about four and a half months a *secondary areola* forms about the primary, which also grows darker as pregnancy advances. In this there are no sebaceous glands, but there are certain white spots which give an appearance as if water had been sprinkled on a dusty paper. This appearance is very characteristic of the secondary areola.

After delivery this secondary areola disappears, and the primary becomes lighter, but not so light as it was before pregnancy. With each pregnancy the breasts become of a darker color.

PIGMENTARY DEPOSITS may occur in different parts of the body.

It is most common to have a darkened line extending from the centre of the thorax to the pubes. As pregnancy advances and as pregnancies recur this line may extend to the sides.

The amount of pigment in the body is always increased by pregnancy, and is noticed also in the vulva and other places.

LINEÆ ALBICANTES OR STRIÆ GRAVIDARUM are markings found about the abdomen after pregnancy, and are due to stretching of the skin, causing the tissue in part to give way. They may also be caused by dropsy or a tumor acting in the same manner. At first they are bluish, but afterwards become white. These striæ are not always found, as the skin is sometimes so elastic that it is not affected by the distention.

CHANGES IN THE VASCULAR SYSTEM AND THE BLOOD.—All authors admit that there are certain changes. The heart becomes enlarged, weighing one-fifth more. The pulse becomes changed, its volume is



increased, and it also becomes harder, sometimes having a corded feel, and the whole vascular system is in a state of excitement. This state of affairs and other changes led the physicians of former years to bleed. It was then found that women who had been bled were not as robust as those who had not been. About this time chemists began to examine the blood, and found that women when pregnant had fewer red corpuscles and less albumin and more white corpuscles, fibrin and liquor sanguinis in proportion. Upon this the conclusion was reached that pregnant women needed building up. This treatment generally increased her disorders. Then the present view was adopted. This is that a pregnant woman really has more blood, and that while the red corpuscles are less in proportion, there are really more in her body than there were before pregnancy. There is abundant evidence to show that instead of being impoverished, a woman is put in a better condition by pregnancy, and is able to stand a great amount of depletion. Pregnant women often have profuse sweating, diarrhœa, and hemorrhages, but these instead of reducing, often make them feel better. They even feel better with dropsy. Congestions and kindred disorders run a rapid course. When the baby is born the mother often recovers in half an hour, showing her power of reaction. Pregnancy is even sometimes a cure for chloro-anæmia, as is proved by the reclamation of sickly girls under its influence, it being not uncommon for them to become strong and well after marriage. Of the two treatments of depletion and building up, depletion has the best results. The condition produced is to all intents and purposes a plethora, and so well is this established that it may be stated as an axiom that *pregnant women bear depletion well*. Pregnancy, as a general rule, is of benefit to women, improving health, and lengthening life.

During the latter months of pregnancy there is an increased amount of fibrin in the blood, rendering it more coagulable. It has been suggested that this is for the especial purpose of preventing hemorrhage after delivery of the placenta. When the blood is drawn and allowed to stand, this fibrin forms a buffet coat.

KYESTINE.—If the urine freshly passed by a pregnant woman is put in a quiet place and covered up and allowed to stand, it will be noticed that in from twelve to thirty-six hours a glistening milky layer will form on the top. This is kyestine. In from three to four days this layer breaks up. Kyestine is not always present in pregnancy, and is often absent during the first and last months.

It has been observed that consumptives and persons with vesical catarrh, articular disease, and metastatic abscesses will have a scum on their urine also. This however appears about the sixth day and is of a greenish color. It is due to decomposition; kyestine is not.

OSTEOPHYTES are calcareous deposits between the skull and dura mater, found in pregnant women about the end of pregnancy. They disappear after delivery.



## CHAPTER VI.

### SIGNS AND SYMPTOMS OF PREGNANCY.

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In classifying phenomena of pregnancy it is impossible to draw hard and fast lines. For instance, many of the changes in the maternal organism are likewise symptoms of pregnancy, and many of the symptoms of pregnancy, when very pronounced, become disorders of pregnancy. Therefore in the classification used the subjects are put under the heads which are most appropriate, and are merely mentioned when they occur again.

Signs and symptoms are of two kinds, rational and sensible. Those are rational which we obtain by reasoning, and for which we have to rely on what the patient tells us. They are also called subjective.

Those are sensible that we obtain by our senses, as by sight and touch. These are also called objective.

#### Rational or Subjective.

**ERETHISM.**—A peculiar sensation at coitus is given by the French as an evidence that impregnation has taken place. There cannot be any value in this idea, as it is now known that impregnation does not take place until some time after coitus, usually some days. It is proper to state here that it is a fallacy to suppose that by deferring coitus to fifteen days after menstruation pregnancy can be avoided, as a spermatozoon may be still lying somewhere in the uterus when the next ovum descends, or an ovum may have been delayed in its descent, and will be captured by the spermatozoon.

**SUPPRESSION OF MENSES.**—This is a rational sign, and is of great value. It has been already stated that when a woman becomes pregnant she as a rule ceases to menstruate. There are, however, many things that should be considered when this is used in arriving at a diagnosis. Should the pregnancy be an illegitimate one the woman may lie about it. Many other things cause a cessation of the menstrual flow, such as debility, consumption, etc. It is often caused by catching cold, getting the feet wet, and has often been brought on by girls getting overheated at parties and then walking out on a cold veranda to cool off.

Occasionally when pregnancy has taken place the stoppage of the flow is incomplete, and women have been known to menstruate all through



pregnancy. Sometimes the ovum does not become attached until near the period for a second menstruation, when the flow will come on again slightly. A woman may also bleed for the first few periods from the menstrual habit. On the other hand, a woman may become pregnant without having menstruated, as when she becomes pregnant about the age of puberty, or before she has gotten over lactation. All of these things, however, do not debar this from being considered a valuable sign, as it is the natural thing to take place with pregnancy.

**PTYALISM OR SALIVATION.**—This is very common. There is an excessive secretion of saliva, and the woman will be continually obliged to spit, much to her annoyance. It occurs during the first two months of pregnancy and rarely lasts after this. It is not usually classed as a disorder of pregnancy, and no pathological changes have been found in the gland. This affection is very disgusting to women. Various remedies have been tried, but there are none that do much good. However, it is well to give an aromatic astringent mouth-wash, and the general health should be looked after. A good expedient to be used at times is to keep a piece of rock candy in the mouth so that the saliva may be swallowed and not expectorated.

**QUICKENING** is a term applied to the first sensation of foetal movement felt by the mother. It usually occurs just before the term of pregnancy has been half completed—not quite four and a half months after conception. There is some variation in the time, and it has happened that some women have gone through pregnancy without feeling the foetal movements at all. On the other hand women are very often deceived in thinking they feel them, especially so with hysterical women and women who desire to have children, most especially sterile women. Movements of gas in the intestine very often mislead. It has been well said that no woman has ever thought herself pregnant without also fancying that she felt quickening. These movements are better felt by women who have been pregnant before, as they recognize the sensation, but even these have been deceived after having borne a great number of children. It will, therefore, be seen that when taken by itself, quickening is not very valuable as a rational sign.

**DIGESTIVE DISTURBANCES.**—*Anorexia, Pica, Malacia, Nausea and Vomiting.*

**ANOREXIA**, or loss of appetite, is an almost invariable accompaniment of pregnancy, but as there are so many other things that may cause this it should hardly be considered by itself.

**PICA.**—This is what is commonly known as “longings.” A woman will want things that she never liked before, and the appetite is liable to very strange freaks.

In such cases the woman should be allowed to have what she wants, provided it is not harmful. Ignorant superstitious people often say that



birth marks are caused by ungratified longings. There is no truth in such apprehensions.

**MALACIA.**—This is when longings are exhibited for things not intended or useful for food. Pregnant women often want to eat slate pencils, plaster, and such strange things. In fact, there is no limit to what such women may desire to eat.

**NAUSEA AND VOMITING.**—This is an almost invariable accompaniment of pregnancy. In its simplest form it consists only of nausea, but in the majority of cases there is also vomiting. It often happens that the vomiting is carried to such an extent that it seriously impairs the health of the woman. In this case it becomes a disorder of pregnancy, and should be so classified, but for convenience it will be considered in this place. Women have not infrequently died of excessive vomiting.

This symptom is generally first noticed at the time when the next menstruation should take place, and if cessation of flow and nausea both occur at this time they make a very strong case when taken together.

Sometimes, however, nausea sets in immediately after conception.

Nausea may be of a very simple sort, a mere uneasiness, or the nausea may be very considerable, or the woman may vomit and have temporary relief. These symptoms occur so much more frequently in the morning that "morning sickness" is often used as a synonymous term. It generally comes on when the woman first raises her head from the pillow to get up. It is not always the case, however, that it occurs in the morning, as it may come on at night. Some have it during the whole day; some at night while in bed. This condition is supposed to pass away after two or three months of pregnancy, and it generally does, but in some cases it continues all through the period.

Some women are not only nauseated by eating, but the sight of food, or the clatter of knives and forks, or even talking of food is enough to make them vomit. Nausea and vomiting is caused by sympathy of the stomach with the uterus in the changes incident to pregnancy, and is not necessarily associated with any disorders of that organ. A woman may die from excessive vomiting, and not have any visible pathological conditions in the stomach. There is, however, another nausea and vomiting that may occur later in pregnancy that is due to pressure on the stomach from the enlarged uterus.

The simple form of nausea is where it may produce a good deal of discomfort, but does not require a physician. The severe form generally starts with the simple, then the vomiting continues for a longer period of time until it may be all day. Then fever comes on, and the tongue becomes heavily furred, and often mucus and blood are vomited. Occasionally the food is retained for several hours, and again it is vomited immediately. Sometimes it will be retained after eating the second time.



A good spirit is of utmost importance in dealing with this affection, and the woman should be encouraged, and told that it will only last for a while. She should have plenty of fresh air, and, if she is able, should go to the seaside, or change from the city to the country, or from the country to the city as the case may be.

The woman of course becomes very much emaciated, but the emaciation is not communicated to the child, and it never dies from emaciation caused by vomiting, although the shock of the retching may cause abortion. Abortion, should it occur, almost always relieves the woman.

*Treatment of Nausea and Vomiting.*—Every article in the *materia medica* has been tried, but very few with any decided and continuous success. It can only be palliated until it disappears naturally about the third month. When the woman is in the recumbent position, she is generally more comfortable, so it has been found best for the woman when so affected to lie on a lounge during the day instead of sitting up. The morning meal should also be taken in bed, and she should lie abed for an hour or so afterwards. The stomach will then be strengthened, and she can then get up and eat again in the evening. It is best to drink tea and coffee in the morning with bread or by itself. Occasionally it will be found better to give wine or mint julep or lime water and milk or lithia water or carburetted water. Milk can often be charged with carbonic acid gas. Meat juice is often good, Valentine's being one of the best. Buttermilk is often useful when sweet cannot be borne. Sometimes cold food is retained best, sometimes hot. Fresh air is often very beneficial, and the woman should be encouraged to walk out and visit. The general health should be looked into and treated, *e. g.*, constipation, diarrhœa, malaria, etc. If the diagnosis of malaria is positive, quinine could be given, but unless the malarial poison is present to absorb the quinine, it is liable to produce abortion. It should, therefore, only be administered as a choice of evils. If the patient is bilious, she may be purged with advantage, using calomel and soda, or of calomel and jalap  $\text{āā gr. viii}$ . Small doses of calomel frequently repeated act well. Scammony,  $\text{gr. x}$  and jalap,  $\text{gr. xv}$  may be given instead of calomel.

Of the medical remedies, oxalate of cerium is in most cases the best, administered in  $\text{gr. ii}$  doses. The various pepsins have been used very largely with varying success. Carbolic acid in  $\text{gtt. i}$  doses is often of great service, and ranks after cerium.

The following prescription has often given good results:

R	Acid carbol . . . . .	gtt. xvi
	Tinct. zingerbis . . . . .	
	Glycerinæ . . . . .	āā 3 ii
	Aquæ, q. s. ad. . . . .	3 ii
M.	Sig. Teaspoonful every six hours.	



Dilute hydrocyanic acid in gtt. ss. doses every six hours is also very good. Tinct. Iodine, gtt. ss. to i; Wine of Ipecac, gtt. i to iii; Cocaine, 4% solution gtt. x have all given good results. A circular blister, three inches in diameter over pit of stomach, is very good. The older doctors used to strip the blister, and dress with morphine, but it is better to use them separately. There are a number of ways in which morphine can be used. The dose should be very small if given hypodermatically, gr.  $\frac{1}{8}$ . This dose of valerianate of morphia may be given by mouth if it can be retained.

McMunn's elixir of opium is also very good, having the same effect as laudanum without its after effects. If given by mouth, the dose is 10 to 15 drops, but it is best given by the bowel, when the dose is doubled. One reason for giving by mouth is that it thus sometimes blunts the sensitiveness of the stomach, but it is better given by the bowel as it then acts more directly on the uterus. The liability to form the habit is always a great objection to morphine and opium. Bromide of Potassium is often a valuable remedy, and is more efficient when administered by the bowel. It should be used only once daily, and is given  $\mathfrak{z}$ i dissolved in a few tablespoonfuls of water. Tinct. Aconite in half drop doses, and nitroglycerine in gr.  $\frac{1}{100}$  have both been used with advantage.

Smearing of the os with belladonna ointment has been practiced.

Another line of treatment is directed to the uterus itself. The cervix is often found to be ulcerated, the congested condition of it incident to pregnancy makes this more liable to happen. If nausea and vomiting cannot be cured by ordinary means, it becomes a duty to examine the uterus, and if any ulceration is found, curing it will often cure the nausea and vomiting.

Examination should be made with great care on account of the liability to produce abortion.

Prolapsus of the uterus may be the cause. This condition is physiological at first, and causes the flat belly and depressed navel of early pregnancy. Later on the navel ceases to be depressed, and still later becomes pushed out and pouting. This prolapsus of the uterus does not necessarily cause nausea and vomiting, but sometimes when other means fail elevation with a pessary will relieve. This may be worn for the first three months of pregnancy, but after that should be removed. Some books recommend dilatation of the os by introducing the finger, or a dilator may be used, but this operation is exceedingly liable to bring on abortion, and is very hazardous, and is attended by questionable benefit. Sometimes the cervix is touched with a strong solution of nitrate of silver or iodine with good results.

But it sometimes happens that all of these means fail. What is then to be done? Feeding by the bowel may do some good, but the patient is feverish at night, and delirious, the lips are thick and the tongue glazed,



sordes are on the teeth, and she vomits blood. There is but one resort left, and that is to produce abortion. This should never be done without a consultation, but when both decide that there is no other resource left it should be produced at once. By doing this many lives have been saved, but some die. Abortion is always a great strain, but especially so to a woman so reduced. Therefore the proper relatives or friends of the patient should be warned of the danger. But the fact that some do die is no bar to making an effort to save life, as this last resort should never be used until it is positive that there is nothing else that can be done.

### Sensible or Objective.

PALPATION affords very valuable and confirmatory signs of pregnancy. This term is applied to the act of feeling the abdomen with the hands, and thus endeavoring to make out the character of its contents.

The size and shape of the tumor, and its growth from time to time, can thus be made out.

As has already been stated, the uterus all during pregnancy continues to alternately contract and relax. About the fourth month this becomes so pronounced as to be felt by the hands placed on the abdomen, and thus a valuable sign of pregnancy is secured, together with the means of diagnosing this tumor from fibroid of the uterus or tumor of the ovary.

It also affords a very valuable confirmatory sign of quickening. When the foetal movements are felt by the physician through the abdominal wall it is a positive sign not only of pregnancy, but of the life of the foetus. It is not, however, always easy for the physician to make out the movements, especially in fat women, or women who have ascites or general anasarca. Some women are so sensitive that they will contract the recti muscles as soon as they are touched, so that it is impossible to feel anything; or they will twitch in such a manner as to simulate very closely the movement of the foetus. Some women are so sensitive that they are thrown into a paroxysm of pain when the slightest pressure is made. In other cases the foetus may be floating in so much fluid that it cannot be felt.

Together with palpation, such signs as can be detected by inspection should be noted.

BALLOTTEMENT.—This is a very positive sign of pregnancy, but is only useful at the fourth month and after.

The sensation received is said to be as if a marble ball were tossed up by a sudden blow from the finger in a bladder distended with water. There are two ways in which it can be practiced—known as abdominal and vaginal.

In the first, the woman lies in bed with the abdomen hanging over its side. One hand is placed on the dependent and the other on the upper



surface. By giving a sudden movement to the hand beneath, the fœtus is driven upward, and is felt above and as it gradually settles down again. This method, however, is not very satisfactory.

The vaginal method may be practised standing or lying. The first is the better way, but it is so apparently indecent that it is seldom used. It is done by passing one or two fingers of one hand into the vagina until they rest upon the uterus just in front of the cervix, while the fundus is steadied by the free hand on the abdomen. By a sudden movement upward of the fingers in the vagina an impulse is communicated to the fœtus which causes it to float upward in the uterine cavity, when it is felt by the hand on the abdomen. As it returns to its former position it can be felt again.

When practised lying the head and shoulders should be somewhat elevated, when it is done in the manner just described.

If the head and shoulders are not elevated the fingers should be passed posterior to the cervix.

At one time the finger was introduced into the cervix. This is very dangerous and unnecessary. This sign is very useful, as it is almost a sure sign.

It does not, however, reveal whether the fœtus is dead or alive, as although the maceration following death makes the fœtus lighter, it still, as a rule, answers to the test. There are only two ways of being led into an error. One is where there is a very large stone in the bladder, and the bladder is distended with water. By causing the patient to pass her water, or by drawing it off with a catheter, this source of error is removed. If a stone is suspected, it may be detected by the use of the sound.

Antiversion and antifixion may likewise lead into error, but the bimanual examination, one hand on the abdomen and the fingers of the other in the vagina, should detect the difference in size between a pregnant and a non-pregnant uterus.

It is unfortunate that this valuable sign is not of use earlier than four or four and a half months. It continues to improve as a sign up to the seventh month. After this it is not so good; after the eighth month it is comparatively valueless.

In breech cases it is of little service; in cross presentations, none. There is one caution to be observed. Simply giving a punch with the finger is not sufficient; it must be given in the long axis of the uterus.

AUSCULTATION.—By means of the stethoscope the fœtal movements may be heard before the sensation of quickening is experienced by the mother.

By auscultation *sounds of THE FŒTAL HEART* can be heard, and thus is secured the *most valuable sign of pregnancy*.



This sign, when heard, is sufficient of itself to establish an absolutely certain diagnosis of pregnancy, and thus stands in strong contrast to signs of the early months.

It should always be heard in the advanced stages. Very skillful men have heard it as early as at the end of the third month. With those who have had practice it can usually be made out by the end of the fourth, while at the end of the fifth month it can be very generally heard. At the end of the sixth month it should always be heard, and from this time on it increases in distinctness. The beats average from 130 to 160 per minute, and resemble very much the tic tac of a watch placed under a pillow. It has been affirmed that a slow beat indicates a large child; a rapid beat, a small child, and also that when the beat approaches 160, a girl may be expected; 130, a boy. This, however, is very uncertain, and cannot be relied upon.

In the earlier months the sounds are heard most distinctly at or near the umbilicus, later over the iliac fossæ; generally the left. A radius of two inches around the centre of a line drawn from the umbilicus to the middle of Poupart's ligament, marks the point at which the heart is usually heard. The beat of the aorta is generally very distinct, being transmitted through the uterus, but should not be confounded with the fœtal heart, as the sound is not only different, but the rate is also different, the aorta being from 65 to 85. If the rate is not a sufficient guide, the finger may be placed upon the pulse to note whether that is synchronous with the sound heard. There are several things that may prevent the sound being heard, or make it very indistinct, as when the woman is the victim of ascites, or has dropsy of the amnion, in which latter case the sound has generally a tinkle. The sound may also be obscured by having a fold of intestine between the uterus and the abdominal wall, or by borborygmi; or by the fœtus being placed with its spine posterior, in which case the arms and legs will be interposed, or the child may be feeble or unwell.

The beats are increased by any active movement of the child, and lessened by the pressure of labor pains. After relaxation the beat again becomes normal. After the bag of waters ruptures, the sounds are heard better than ever before. The fact that during a labor pain the heart beats with less frequency and power, furnishes a valuable guide to the physician, as when at the commencement of a tedious labor the beats are good, but after awhile commence to get feeble or interrupted, he is admonished that labor should be hurried up as much as possible, and if necessary the forceps applied.

The diagnosis of twins can sometimes be made by hearing the fœtal heart in two opposite places with equal distinctness. If there is only one child the sound will be indistinct at every point but one.

If it is not certain that two hearts are heard, some other physician may



be gotten to listen at one place, when by tapping his finger on your hand it can be at once determined if the beats are different.

**FUNIC SOUFFLE.**—This sound is infrequent and hard to diagnose. It is caused by the cord being wrapped around the body, or pressed on in some other way, and is only heard when this happens. It is less distinct than the foetal heart, and is single. It can be diagnosed by finding the foetal heart elsewhere.

**UTERINE SOUFFLE.**—This has also erroneously been called the placental souffle and iliac murmur. It is a blowing sound somewhat like the funic souffle, but not so frequent.

It was supposed at one time to be due to pressure by the gravid uterus on the iliac arteries. It is now known that this cannot be true, as in this case it would be constant, while on the contrary it is not always heard, and is very irregular, being loud at one time and soft at another.

It has also been supposed to be due to the aggregation of large vessels in the placental sac, but the same arguments apply to this as to the iliac arteries, and, besides, in this case it would cease with delivery, whereas it is usually heard for several days afterward.

The accepted theory is that it is due to the fact that the numerous small vessels of the uterus become enlarged and distended with blood as pregnancy advances, and numerous small arteries spring up where previously there were none. The friction caused by pressure on this largely increased supply of blood gives rise to the sound. The reason why it is inconstant is because the child is not always so situated as to make pressure, and the sudden cessation observed is due to the child changing its position. It is synchronous with the mother's pulse.

Other signs of pregnancy already described are:

Pigmentary deposits (page 66).

Depressed and afterwards pouting umbilicus (page 78).

Lineæ albicantes (page 66).

Changes in the mammæ (page 66).

Change in the color of the vagina (page 60).

Softening of the cervix (page 62).

Hegar's sign (page 62).



## CHAPTER VII.

### DISORDERS OF PREGNANCY.

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Some of the conditions which have been already described under "Changes in the Maternal Organism" and "Signs and Symptoms of Pregnancy," when exaggerated become Disorders, and properly belong under this head.

Nausea and Vomiting is the most conspicuous example.

CONSTIPATION.—It is very rare that a pregnant woman is not constipated. Even in her normal unimpregnated state, on account of her sedentary and other habits, she is usually so; and when in addition she becomes pregnant, this condition is almost sure to prevail. The reason for this is that the enlarged uterus in the early months presses on the bowel in the true pelvis, and in the later months on the sigmoid flexure. Constipation is bad in itself, but much more so in the pregnant woman, where she not only has to eliminate the refuse matter from her own body, but that from the foetus as well.

*Treatment.*—Under such circumstances aperient medicines should be prescribed. Mercury and aloes cannot be given, as the first would affect the system, and the second might produce irritation of the uterus. Drastic cathartics, causing retching or tenesmus cannot be given, as they are liable to produce abortion.

At times it may be necessary to give such medicines, but then it only becomes a choice of evils. There are several remedies that are especially useful in this connection. One of the best is the fluid extract of cascara sagrada in teaspoonful doses at night, which does not leave the patient constipated, but acts as a tonic to the bowels. The dose can be diminished or increased as indicated.

Senna is very good, and is often taken in the form of tea, made by boiling a pinch of the leaves taken up with three fingers, in a teacup of water. The compound licorice powder is an excellent preparation for giving senna.

Rhubarb is aperient and tonic, but is not so sure to act, and is apt to cause constipation as an after effect.

The following is a good way to administer it:

R	Pulv. Rhei . . . . .	℥i
	" Cardamomi . . . . .	℥i
	Vini portense . . . . .	Oi
M: Sig.	"Shake well." Tablespoonful at night.	



This makes an exceedingly useful laxative, and is a capital remedy. The wine gives a pungent taste, and the cardamon seed relieve griping.

In summer, and sometimes in winter, the different kinds of salts may be given—Rochelle, etc. These act also as diuretics.

Many of the mineral waters are good to use—Hunyadi Janos, Rubinat, Apenta, Villacabras.

The French preparation of Tamar-Indien is useful, as it is put up as a confection.

**RELAXATION OF THE PELVIC JOINTS.**—It has already been noted that normally these joints become more movable during pregnancy. It sometimes happens that this condition becomes exaggerated, and requires treatment.

*Symptoms.*—The patient will feel weak and tired after taking any exercise, will experience pain, which is usually referred to the seat of the trouble, and will complain that something gives way in her pelvis. By putting the fingers on the articulating bones, while the woman transfers her weight from one foot to the other in the standing position, the existing mobility can be detected and localized.

*Treatment.*—This consists in prolonged rest in bed, both during pregnancy and after delivery. When the patient is allowed to move around, the pelvis should be supported with some suitable apparatus or by bandaging.

Recovery is almost always slow, and occasionally does not occur. One attack predisposes to another.

**INFLAMMATION AND RUPTURE OF THE PELVIC JOINTS** have occurred, but very rarely.

**ANÆMIA.**—When this condition occurs during pregnancy, it should be treated by suitable tonics and regulation of the system. Where it exists it renders the patient liable to serious accident in parturition.

**PERNICIOUS ANÆMIA.**—This is fortunately a very rare disease. It should be treated after the manner of anæmia, giving good food and tonics. The termination is usually fatal.

**VARICOSE VEINS** occur very frequently in pregnant women. *Primi-gravidæ* and *multigravidæ* are almost equally liable. In the former they occur from the fourth to the fifth month; in the latter from the second to the third.

The lower limbs are usually alone affected, the internal saphenous vein being the common seat of the trouble.

Causes lie in the force of gravitation; pressure of the pregnant uterus on the abdominal veins; changed condition of the blood, and greater blood pressure.

Varicose veins render the patient liable to eczema and cause considerable discomfort. The most serious complication that can occur is



rupture of the vein. This may occur externally through the skin, or internally beneath the skin, causing a bloody tumor. This complication is usually brought about by some trauma, as scratching, or by inflammation, ulceration, or by lifting a heavy weight, straining at stool, etc. It sometimes occurs spontaneously.

When not promptly attended to, rupture may cause death.

*Treatment.*—Uncomplicated varicose veins should be treated by bandaging snugly with some elastic bandage—either flannel or rubber, or by the use of elastic stockings. The patient should assume the recumbent position for a good portion of the day, and avoid anything that would be likely to cause rupture, as straining at stool, violent exercise, etc. She should also be directed how to proceed in case of rupture, and should have means at hand for arresting the flow until the doctor can be summoned.

If rupture has occurred internally, resulting in a blood tumor, this should be treated by rest in bed, bandaging and cold applications.

If the rupture is external, a compress bandaged tightly over the point is usually sufficient to arrest bleeding and effect a cure.

If this does not succeed, it must be borne in mind that bleeding occurs from both the distal and proximal ends. Both of these should be ligated.

**ABDOMINAL PAINS.**—If these result from stretching of the skin on the abdomen, it should be anointed with olive oil. Inasmuch as the name sweet oil is commonly used for peanut and cotton seed oil as well, olive oil should be ordered.

If they are false labor pains, which occur from a few days to weeks before delivery, in very severe cases chloral hydrate or McMunn's elixir can be administered. The fact that opium is being used should be kept from the woman, as she might contract the opium habit.

If they are due to rheumatism or malaria, the usual remedies should be used, but the diagnosis of malaria must be certain, as otherwise quinine might cause abortion.

**LEUCORRHOEA.**—Injections into the vagina should be avoided if possible, as they may induce premature labor, but if the leucorrhœa has gone so far as to cause great distress, the remedies for its cure must be used, as otherwise the leucorrhœa might cause abortion. The remedies used should be as mild as possible.

**DISPLACEMENTS OF THE UTERUS VERY FREQUENTLY OCCUR.**—They should be corrected by properly adjusted supports for the first three or four months, and then withdrawn, as they will be no longer necessary.

**HYDROPS OF THE AMNION.**—It is very hard to determine the quantity of amniotic fluid which would be abnormal. According to some authorities anything over four pints may be called an hydrops, but the quantity of fluid is very variable. It may result in some malposition of the child, the cavity being unusually distended.



*The treatment* should be directed to the general health of the mother. If the condition requires it, abortion can be produced.

**HYDRORRHÆA.**—This condition is due to an accumulation of fluid between the walls of the uterus and the amnion. It is probably produced by an endometritis.

The fluid may escape in a gush or by driblets.

It rarely requires any further treatment than attention to the general health.

**MOLES.**—Any woman who passes a mole has been pregnant.

It is a disease of the placenta which undergoes a form of degeneration. In certain cases the villi of the chorion are converted into a number of small cysts of variable size, giving rise to the name "hydatidiform mole."

The etiology of this disease is uncertain.

Sometimes only a portion of the placenta is affected, in which case the child may be brought to term, but as a rule the entire placenta is involved, causing it to grow in an abnormal manner, and resulting in the death of the child.

*Diagnosis and Symptoms.*—This disease occurs in early pregnancy. It can be detected by the woman enlarging abnormally for three months. The contour of the womb is abnormal; it has a boggy feel, and from time to time a portion of the mole may be passed.

*Treatment.*—If the diagnosis is positively certain, labor should be brought on. It must be remembered that the mass has very little coherence, so it should be removed with great care, pains being taken to remove it all. The uterus should also be cleansed very carefully, as the walls are quite thin and easily perforated.

**HEMORRHAGE FROM THE PLACENTA.**—This may proceed so far as to separate the placenta from its attachment, causing death of the fœtus and premature labor, or the separation may be only partial, resulting in impaired nourishment of the child. Sometimes it is so slight as to have no perceptible effect.

**CALCAREOUS DEGENERATION OF THE PLACENTA.**—This condition is usually slight; when so, it is not dangerous.

**PRURITUS.**—An intense itching about the vulva very often occurs during pregnancy. It is due to the congested condition of the parts.

No remedy gives permanent relief, but the itching may be relieved by washing the parts frequently with warm water and castile soap, and afterwards anointing with carbolized vaseline or benzoated oxide of zinc ointment. Ointment of nitrate of mercury and bichloride wash 1:10000 may also be used.

**INSANITY.**—This troublesome complication may occur during pregnancy, at labor, or during lactation. It is now supposed to be due to a form of puerperal sepsis, and is largely influenced by heredity. The



prognosis as a rule is good, most cases recovering on general treatment. When the insanity is of a high grade, however, it leads almost invariably to a fatal result.

The woman may die in a sudden paroxysm, or from refusing to eat food for a long period, or from some complications caused by the insanity. Where it lasts for a longer time the case becomes more hopeful. Having occurred once, it is liable to occur again.

It usually develops two or three weeks after delivery. The woman may be morose or easily affected to laughter. Both of these conditions pass into active mania with exacerbations. There is an especial tendency to get rid of their clothing and to become vulgar and obscene. The temperature varies, being sometimes normal and sometimes slightly above. High temperature, whether continuous or not, is a very unfavorable symptom.

*Treatment.*—The patient should be separated from all connections with pregnancy, weaning the child, and removing any objects that would suggest its presence. It is especially important to look after the child, as its mother often takes a violent dislike to it, and is apt to do it some harm. When food is refused, it should be introduced through a tube down the œsophagus to the stomach.

**DISEASES OF THE FŒTUS.**—The fœtus is liable to share in diseases affecting the mother—inflammatory diseases, fevers, syphilis, tetanus, dropsy, etc. It is also liable to spontaneous amputations, caused by a limb becoming caught in a twist of the cord, shutting off circulation and causing necrosis. The amputation may also be done by fibrinous bands thrown out from the amniotic sac.

Fractures may also occur from muscular contraction.

**Concurrent Diseases.**—Pregnancy does not give immunity from other diseases. Epidemics attack pregnant women as they do other people. When pregnancy is thus complicated, abortion is liable to occur, so the patient may not only have to run the gauntlet of the disease, but of abortion as well. They are subject also to endemics. The disease is liable to be conveyed to the child, which may be born, for example, with chills and fever.

Pregnant women are probably more susceptible to *eruptive fevers*, and are extremely apt to communicate them to the child.

**VARIOLA** is especially apt to affect the fœtus. The woman, too, is very liable to succumb and to abort.

**TYPHOID FEVER** is not so pernicious, nor is malaria.

The woman, however, lying for a long time in a recumbent position, is to that extent more liable to malpositions.

**SYPHILIS.**—Many authors differ as to transmission of this disease to the child. The mother will invariably have a syphilitic child if she is syphi-



litic. If the disease is contracted during pregnancy, there is some doubt about transmission, but it is probable. If the man has syphilis it is generally thought that he will communicate it to the child. If syphilis is not treated it is apt to cause abortion or death of the fœtus, but if it is properly treated the mother can generally be relieved, and the child born without it and without the cachexia.

The eruption is not exactly like that found on persons who contract the disease primarily, in that it never crusts, and is not so liable to leave marks.

LEAD POISONING frequently leads to abortion.

HYSTERIA, EPILEPSY, and CHOREA are made worse by pregnancy, unless hysteria is due to displacement, when it can be relieved.

PHTHISIS.—If this malady is not developed, pregnancy may check or cure the disease, but if it has become developed, the condition is aggravated, and the child will be born with a predisposition to the disease. Lactation increases the drain on the system, and is a disadvantage to the mother. The child is better fed on the bottle than on phthical milk.

HEART DISEASE.—Owing to the great amount of work placed on the heart during pregnancy, an undiscovered heart disease is often brought to light by it. Women who have heart disease are at a disadvantage in pregnancy.

The treatment is the same as that used under ordinary circumstances, only more care should be exercised to prevent any excitement or strain.

THE THYROID GLAND is enlarged by pregnancy, often, if not too much so, adding to the handsome appearance of the woman.

It may become so enlarged as to press on the trachea, and interfere with respiration, calling for medical and surgical interference.

INFLAMMATIONS AND ULCERATIONS OF THE CERVIX.—Very small ulcers on the cervix during pregnancy are not pathological, but if they are large and encroach on the canal, they should be treated. If the trouble is due to polypus, it will be worse during the first months, but after that will get well. Supports should be used if needed.

SURGICAL DISEASES.—Operations are frequently performed on pregnant women, but should be avoided if possible. If the disease is one that is apt to cause abortion, an operation is called for. If a limb is broken union takes place, but not as quickly as with the non-pregnant.

Some tumors, on account of their growth or because they would interfere with labor, require operation; others do not.

Other diseases are liable to occur during pregnancy, and have to be treated as the judgment dictates. These notes are so limited as not to permit of their consideration.



## CHAPTER VIII.

### ALBUMINURIA, URAEMIA, PUERPERAL CONVULSIONS.

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These three subjects are treated together, as they stand in the relation of cause and effect. No subject in connection with pregnancy is of more importance.

When albuminuria exists in pregnant women it is apt to lead to grave conditions which may cause death.

To facilitate memorizing them, these conditions may be called the three P's, and are Puerperal Convulsions, Premature Labor, and Post Partum hemorrhage.

**Albuminuria.**—The study of albuminuria is comparatively recent, and in connection with pregnancy is more recent still. The prognosis is not so grave as when it is not connected with pregnancy, for if the woman can be tided along until after labor the albuminuria will then generally disappear; but it is grave enough.

**PATHOLOGY.**—The exact pathology of the albuminuria of pregnancy has never been determined.

Pregnancy, however, causes very frequently an albuminuria, which, unless there is some coexisting structural disease of the kidneys, will pass off after delivery, leaving the kidneys after a time in a perfectly healthy state.

When albuminuria occurs in pregnancy it may be traced to either the kidneys or the condition of the blood. If the kidneys are at all diseased, pregnancy aggravates the trouble.

The blood of the pregnant woman is especially rich in albumin. While the total amount is very much increased, it will be found, however, that the amount in a given quantity of blood is less than normal, owing to the dilution by a greater excess of blood. The child's system requires albumin in large quantity. The mother is, therefore, especially adapted for producing it. It has been found that where animals have been fed exclusively on albumin, or where it has been injected into their veins, that the excess is passed by the kidneys. When, therefore, the mother produces more albumin than would be normally required, or where the child is weak, and small, and not able to consume the normal amount produced, the excess is passed by the kidneys. When the woman produces more albumin than is consumed the condition is called super-



albuminosis. It has been found that pressure on the renal veins causes albumin in the urine. The intra-abdominal pressure due to pregnancy has, therefore, also an effect, as also has sympathetic irritation incident to the pregnant condition.

**SYMPTOMS.**—These are often not so well marked as might be desired. If albuminuria could be detected early enough more could be done with the patient.

*Dropsy*, commencing first in the lower limbs and afterwards becoming more general, is one of the commonest. There is a dropsical condition often present below the waist, which is due to pressure on the veins by the gravid uterus, thus retarding the return flow of blood. This should not be mistaken for the dropsy of albuminuria, which is a general anasarca.

Dropsy in the lower extremities, due to pressure, tends to disappear when the pressure is removed by lying down, but in general anasarca it appears always at the most dependent part, so while it may disappear from the feet on lying down, it will collect in the cellular tissue of the back, or whatever is the most dependent part. However, all doubt should be removed by *testing the urine*.

But even this symptom is not always present. Grave disorders of the kidneys may exist without swelling, and albuminuria in pregnant women causes dropsy in only about a little more than one-half of the cases.

The presence of albumin is nearly always associated with other conditions in the urine. *Urea* is usually deficient. This represents one of the chief waste products of the body, and should be freely excreted, but is not, although the woman passes a great deal of water. When urea is thus retained it will usually cause grave consequences. It has been thought that an excess of urea could be detected by examining the blood, but this is not always a sure method, as physiologists have never determined the normal quantity. We can, however, by this means, and the examination of the urine, reach an approximate conclusion.

Paleness and puffiness of the face, disorders of digestion, indisposition, disorders of vision, and constant and severe pain in the epigastric region and the frontal part of the head, are symptoms which accompany albuminuria, and should at once direct attention to the urine. The importance of examining the urine under any conditions during the latter part of pregnancy cannot be overestimated, as often albumin in the urine is the only symptom present. When albumin has been present for a sufficient length of time uræmia follows.

**Uræmia** is caused by certain waste extractive matters remaining in the system that should be eliminated by the kidneys. This definition covers the real cause of uræmia. An effort has been made to determine which of these matters it is that causes the trouble.



Urea was for a long time supposed to be the prime factor, and hence the name, but experiment has not fully borne out this theory. It seems, indeed, that the symptoms are not caused by any one product, but by them all.

**SYMPTOMS.**—These embrace those of albuminuria with other symptoms added.

*Dropsy.*—General anasarca or œdema are most common. Frequently there is trouble with the vision. This can be detected with the ophthalmoscope, and is known as *albuminuric retinitis*. Sometimes the vision is obscured, or only half of the object may be seen, or all but certain spots. The condition of the sight varies, being sometimes better; sometimes worse.

*Headache*, of the most severe kind, is one of the most frequent symptoms. This pain cannot be controlled by medicine, and is generally accompanied by pain in the epigastrium. Vertigo and ringing in the ears are present, also frequently nausea and vomiting and a profuse diarrhœa. Often mental obtuseness is produced, and sometimes delirium. If this state continues, it may lead to convulsions, premature labor, and sometimes post-partum hemorrhage.

In this connection the *method of testing the urine* is given, as it forms the most important means of arriving at a diagnosis. For this purpose heat and nitric acid used together are perfectly reliable and superior to any other test. Heat by itself will usually coagulate the albumin, but occasionally it will not when the urine is highly alkaline. Or it may cause a precipitate of earthy salts, which might be mistaken for albumin. Nitric acid would clear this up, and coagulate the albumin if present.

Nitric acid by itself will coagulate the albumin, but an excess is apt to break it up again in very small pieces. Nitric acid does not protect from deposits of uric acid. These, however, are readily dissolved by heat. When both are used, one corrects the deficiencies of the other. A few drops of the acid should be added to the urine in the test tube.

The upper portion of this should be boiled over a spirit lamp, and if any albumin is present, it will be shown by a more or less amount of cloudiness in the urine that has been boiled. The lower portion, not having been boiled, makes the change all the more apparent. Albumin may be present without appearing in the urine at every discharge. When, therefore, the symptoms point to albuminuria, a diuretic should be given to flush out the kidneys, and if albumin is present it will then appear. The urine should also be examined at different times.

Occasionally the woman may have such a profuse discharge from the genitals that the urine flowing over it will carry along enough to make it appear to be albuminous. If this condition exists, the woman should be washed, and then pass some water to wash out the parts; then pass some



for examination, or it can be drawn by a catheter. Sometimes the urine is made to appear to be albuminous by mucus from the bladder, due to some cystic irritation.

It is very important to ascertain whether the albumin is due to structural change in the kidneys, or to pregnancy. For this purpose chemical tests are insufficient, and a careful microscopical examination is necessary. If due to structural change, casts will be more numerous and have more or less fat globules adherent. A diuretic should be given first to wash out casts if any are present.

If the albuminuria occurs in the last three months of pregnancy, it is apt to be due to pregnancy; if earlier, to structural disease. Pregnancy predisposes to structural disease of the kidneys.

The dropsy of albuminuria often requires special treatment. In general dropsy the fluid collects not only in the cellular tissue, but in the cavities of the body—notably the peritoneal.

In this case the effusion may be so great as to endanger life. When all medical treatment is of no avail, something else must be done. Tapping is most frequently resorted to, but owing to the presence of the enlarged uterus, this is apt to produce peritonitis. The median line is the point usually chosen, but other places are not more successful, except one point. This is the navel. In all other places there is not only the wound on the abdominal wall, but usually one also on the uterus or intestines; but when the navel is used only one wound is made, and the operation is usually successful.

When dropsy in the cellular tissue is excessive, it should also be relieved by tapping, as otherwise it might rupture. This is usually done by puncturing with a large needle in a number of places, allowing the serum to exude drop by drop.

**Puerperal Convulsions** follow as a consequence of uræmia, and uræmia as a consequence of albuminuria.

They occur most frequently during delivery; next during pregnancy, and least frequently after delivery. It is difficult to make a proper definition of puerperal convulsions. The following has been devised as expressing the condition correctly, and differentiating it from other similar affections:

**DEFINITION.**—*Puerperal Convulsions are a fit or series of fits in which nearly all the muscles of relation, and often those of organic life, are convulsively contracted, usually accompanied or followed by more or less complete suspension of sensorial and intellectual faculties for a variable period of time.*

These convulsions do not occur oftener than once in two to four hundred deliveries, and the figures may be placed as nearer two than four hundred. They usually occur about the time of delivery, but may occur as far off as twelve days after.



A woman may have convulsions during pregnancy or delivery which are not puerperal. A nervous or hysterical woman may have a convulsion that is purely of nervous origin. An epileptic may have an epileptic convulsion. The puerperal convulsion has a certain history, cause, method, etc., followed by certain pathological features, and can only occur with pregnant women.

**PREDISPOSING CAUSES.**—It has been found that they almost invariably give a history of albuminuria. In cases where albumin has not been found, either the urine was not examined, or not examined skillfully, or the albumin was present intermittently.

Although these convulsions always give this history, albuminuria is not by any means always followed by convulsions. They occur only once in seven or eight cases.

Seven-eighths of the women who have convulsions are primipara, due probably to the greater amount of pressure in such cases.

Women with twins or with hydrops of the amnion are more liable, also those with Bright's disease, or any condition producing albuminuria.

**DETERMINING CAUSES.**—Causes producing an explosion are any which disturb the general health, or any accident in birth, as prolonged delivery, cross presentation, use of instruments, rigid os, contracted vagina, dense unyielding perineum, distended bladder from neglect or from pressure on the urethra, or inflammation of the bladder from pressure. Imprudences in diet are also very apt to cause an explosion. It may be generally stated that anything tending to make labor long, hard, or difficult may act as an exciting cause to bring on convulsions.

**PATHOLOGY.**—The true cause of this condition is retention of excrementitious matter in the system. After the convulsion has occurred, the whole system is found to be cyanosed, with a collection of the fluid in the blood. The collection of fluid is especially marked in the brain and cranial vault, and this condition has been given as the cause of the convulsions. This is, however, a result and not a cause.

Among the muscles of life which may be involved is the heart, which contracts and drains back the venous blood. The glottis is contracted and tense, interfering with respiration, and so preventing the oxidation of the blood. Not only is the heart affected, but other hollow organs as well, the bladder, stomach, and rectum often emptying themselves by contraction. The fluid in the brain may collect to such an extent as to cause anæmia of the brain by pressure. In cases followed by death, one always looks for and expects to find structural disease of the kidneys.

#### SYMPTOMS.

**PRODROMATA.**—Puerperal convulsions rarely happen without prodromata, but women have so many ailments that they themselves are



disposed to look on these as something natural, and do not seek medical aid. The physician, however, should recognize them and confirm his suspicions by an examination of the urine. These prodromata consist in œdema, especially of the face; headache, usually frontal; digestive disturbances, epigastric pain, and\* disturbances of the vision, floating spots, seeing double, etc.

**SYMPTOMS OF THE CONVULSION.**—If the woman is engaged in conversation she will suddenly stop, and her face will commence to twitch about the eyes, nose, and neck. This gradually spreads until the whole body is involved, and the eyes roll. This lasts for about a minute, and marks the initial stage, which passes into the second stage of tonic convulsions. These movements become exaggerated, the whole body is continuously contracted, the tongue protrudes, and the teeth clinch, and unless precautions have been taken to prevent it the tongue will be bitten. This stage lasts for a few seconds, and then passes into the third stage of clonic convulsions. In this the muscular system alternately contracts and relaxes. The glottis becomes contracted, causing a hissing sound. The salivary glands are pressed upon and congested, causing the saliva to run out, and this is worked into froth by the respiration, and comes out between the teeth, generally mixed with blood if the tongue has been caught. The most beautiful face is rendered hideous. This lasts from a few to five or ten minutes, when all of the symptoms gradually subside. During the stage of clonic convulsions the contractions may take place several times in a second. When these subside the cyanosed face, stertorous breathing, etc., disappear, and the patient sinks into a coma, from which it is hard to awaken, and in which she usually remains until the next convulsion. If recovery will follow they may return, but at increasing intervals, and in the meantime the patient may recover consciousness to a certain extent. On the other hand, if the convulsions become more frequent, and the intervals continually shorter, a fatal termination may be expected. When the patient awakes, she will look around the room, and will be surprised to see anxious faces, and will be totally unconscious of what has happened. She should never be told that she has had a convulsion, as the shock would be likely to bring them on again.

#### DIFFERENTIAL DIAGNOSIS.

*In hysterical convulsions* unconsciousness is not perfect; the thumb is extended, the limbs are flexed, and there is no frothing at the mouth or hissing sound or biting of the tongue. In puerperal, unconsciousness is complete, the fingers are clasped over the thumb, the limbs are extended, rigid and jerking; there is frothing at the mouth and biting of the tongue, and there is a hissing sound.



*In cataleptic convulsions* the contraction is constant, tonic, and the limbs will remain in any position in which they are placed.

*In tetanus* the rigidity is constant. There may be some relaxation, but it is very slight.

*Epilepsy* is most difficult to differentiate. In this, however, albumin is usually not present in the urine, there is a history of previous attacks, and the convulsion generally commences with a terrible scream.

*Coma*.—In simple coma there is no history of a convulsion. It usually comes from apoplexy or paralysis, and unconsciousness is not perfect. When it results from concussion of the brain, there are the marks of the injury and history of accident.

In alcoholic coma there are the vomit and vinous odor of the breath.

PROGNOSIS is not good. One in three or four dies. The statistics are usually from hospitals where the best treatment and attention are furnished, so they must be less than those of private practice. As has been stated, the character and frequency of the convulsion aid in the prognosis. If they become more frequent and violent, they are apt to be fatal; if they become less frequent and violent, there is a disposition to recover. Besides in recovery and death, convulsions may terminate otherwise. The uterus may rupture. The brain may become so congested as to lead to meningeal attacks. Intellectuality may become disordered, and the patient may become either stupid or maniacal. Sometimes the violence of treatment may injure. If the patient has a weak vessel in the brain, it may burst, causing apoplexy.

EFFECTS ON DELIVERY.—Sometimes the womb is not disturbed, but the rule is that convulsions will bring on labor, and the nearer it is to term, the more likely this is to happen. Therefore, the woman should always be examined at intervals, to see if labor has been induced. It has sometimes happened that the physician has been so absorbed in caring for the mother as to neglect the child, which has been born and then suffocated or drowned in the discharges without the physician knowing of its birth.

EFFECTS ON CHILDREN.—Children born under these conditions are not only liable to death in delivery, but are as a rule never very healthy, and are also subject to convulsions, and may develop them after birth.

TREATMENT.—In delivery under these conditions, care should be taken to make as little manipulation as possible, and to thoroughly remove the after-birth, membranes, and clots, as the woman is especially predisposed to all the evils which these may induce.

PROPHYLACTIC TREATMENT.—As puerperal convulsions give a history of albuminuria and uræmia, treating these may prevent the convulsions. The patient's general health should be looked into, and anything wrong corrected. Then it should be ascertained if any cachexia exists, and treated. Then the special treatment for albuminuria should be introduced.



In this diet is of the greatest importance. Indigestible food should not be eaten, especially at night. Meats and especially meat suppers are most pernicious, and should be avoided, also grease and sweets. An exclusive milk diet is the best and most innocent, and sometimes has been known to cure by itself. Skimmed milk is the best. Medicines may be employed to great advantage. Occasionally small doses of calomel, half grain, may be administered t. i. d. until six have been given. Small doses are best. This opens up the bowels freely, acts on the liver and as a diuretic, and so eliminates the effete matter from the system. Bichloride of mercury in small doses in compound tincture of cinchona, is very good, acting as a tonic and alterative. Nitroglycerin is very effective, one hundredth of a grain being a sufficiently large dose, repeating if necessary. The treatment may be commenced with one dose every six hours, increasing in frequency as indicated, and watching the symptoms carefully. Cream of tartar is very valuable, acting both as a purgative and diuretic. In commerce it is greatly adulterated, and care should be taken to obtain it pure. It may be given a teaspoonful in a tumbler of water, t. i. d., and if the bowels are made too loose, the dose can be reduced. This may be taken in a cup of cold juniper berry tea.

Unless the woman is very anæmic, small bleedings may be practised. From four to six ounces should be taken, and it is best to draw it from the region of the kidneys. This for a time at least relieves the kidneys of congestion, which explains the benefit. The benefit is not always permanent, but it often prevents the patient from going from bad to worse. Digitalis and fluid extract of convallaria are very good as diuretics and heart stimulants, but digitalis cannot always be used. The infusion is a better diuretic than the tincture, and should be used. Acetate of potassium is a very good diuretic, and may be given with excellent results, combined with infusion of digitalis.

R	Potassii acetat . . . . .	℥viii
	Infus digitalis . . . . .	℥iv
M.	Filter. Sig. Tablespoonful t. i. d.	

Jaborandi and pilocarpin are too depressant to be used in this affection. Tepid baths cause the skin to excrete freely, and are not so debilitating. After much of this derivative treatment the patient is apt to become debilitated. In such cases iron is required.

#### TREATMENT OF PUERPERAL CONVULSIONS PROPER.

This depends on the condition of the patient, and whether delivery is near or remote or has taken place. If the patient is attacked before the child has come to term, every effort should be made to palliate her condition until seven months of term have been completed. If labor sets in after this time it should be hastened as much as possible, and followed by



a thorough cleansing of the uterus. Frequently it is well to irrigate with a weak bichloride solution, one to seven or eight thousand. Anything left in the uterus tends to irritate the condition of the patient.

Bleeding is a very useful remedy. This should preferably be done from the median cephalic, the one furthest from the trunk. The median basilic is much more prominent and easily gotten at, but bleeding from this is attended by danger of puncturing the brachial artery. After the proper amount of blood has been withdrawn a small pad of gauze should be placed over the puncture, and bandaged there by a figure of 8 around the elbow. Bleeding is generally a safe procedure, as pregnant women bear depletion well. There are, however, exceptional cases when bleeding is not to be advised. It is not so often practiced as formerly, and some authors are opposed to its use altogether.

To what extent can bleeding be carried? In the times when bleeding was frequently resorted to, the rule was to bleed until the pulse approximated the normal, but in the present day, when the pulse is not so much studied, this is hardly a sufficient rule. It is safe to say that at the first bleeding, from 16 to 18 ounces should be withdrawn. After this the physician should wait for a time, and if the condition has not been relieved, and there are well marked signs of plethora, he may bleed again, withdrawing from 12 to 14 ounces. In very few cases is a third bleeding to be recommended. The two bleedings will have relieved any congestion, and if too much blood is withdrawn a condition will be produced which may cause a convulsion itself. The first bleeding is generally all that is necessary. If a third should be required it is best done with leeches or wet cups, withdrawing from 4 to 8 ounces.

It is well to always carry a special lancet to be used in such cases.

The next most important remedy is chloroform. This puts an end to the convulsion for the time being. The patient may be kept under its influence during the convulsive seizure, letting up if the convulsion is controlled, and giving again if it shows signs of return. A good swift purgative should be administered, consisting of 10 grains of calomel, or this and 20 grains of soda, or 10 grains each of jalap and calomel. It is well to remember that the patient may be incapable of swallowing. If she is only partially so the above can be given in syrup. It is best administered in the form of powder, as pills might possibly pass into the larynx with serious results. When the patient is slightly conscious, but not enough to swallow, tickling the pharynx will often cause the act. Drop doses of croton oil can sometimes be successfully given when it is, apparently, impossible to use other medicines. Purgatives remove from the bowel any irritating substance, and by their diuretic effect relieve congestions. The bladder should be emptied, and if this cannot be done naturally the catheter should be used. Potassium bromide, 20 grains by



the mouth or 30-40 grains by the rectum, can be administered as a sedative to the nerves. This is well combined with chloral, 15 grains by mouth or 30-60 grains by rectum, which acts not only as a sedative, but also, it is thought, causes a free flow of urine through the kidneys. If there is reason for thinking the woman has been eating improperly over night an emetic should be given.

After the convulsions have been controlled, the history of the patient should be ascertained, and the treatment used as prophylactic instituted. This should be continued 15 to 20 days, or longer.

Very recently the injection hypodermically of the normal saline solution, 1 to 7 litres, at 88° Fahr. into the cellular tissue—preferably of the gluteal region—has been found to promote and favor the secretion of urine. So, also, the old treatment of *veratrum viride* has been revived with varying, but at times favorable, success.



## CHAPTER IX.

### LABOR, AND AFTER-TREATMENT OF MOTHER AND CHILD.

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Labor is of various kinds. The most frequent is *natural labor*. Where anything goes wrong, the labor is called *unnatural*. This term embraces tedious labor, forced or instrumental labor, complicated labor, etc. Labor at the end of nine months term is often called legitimate labor; where it occurs before this it is called premature, and when after, postponed labor. There are two classes of actions in labor—those of the mother and those of the child. The first are physiological; the second, mechanical.

The two principal elements in the production of labor are increased severity in the contractions of the uterus and softening of the os uteri.

Two forces cause the expulsion of the child. Contraction of the uterus is primary and most important; contraction of the abdominal muscles is secondary and auxiliary.

The uterus may and does expel by itself. Contraction of the abdominal muscles may be sufficient, and they are always a valuable aid.

It happens very rarely that the child is born after the death of the mother. This may be caused either by latent contractility of the uterine muscles, or by intestinal gaseous decomposition.

METHOD OF CALCULATING DATE OF LABOR.—Labor occurs from 270 to 290 days after conception, the average being 280 days.

The calculation is made from the date on which the woman ceased to menstruate. But it is absolutely impossible to calculate the exact date. Primipara are apt to be a little ahead of time—one or two weeks. A very good way is to add seven days to the date on which the last menstruation ceased, and count forward nine months, or backward three months.

#### Physiological Phenomena of Labor.

These are divided into a *precursory stage* and the *first, second, and third stages*.

PRECURSORY STAGE.—This embraces those phenomena which indicate to the woman that she is about to be confined. She notices that her waist becomes smaller, and that the uterus does not rise so high. This gives a certain sense of relief by not interfering with the peristalsis of the stomach, and by removing pressure from the diaphragm, enabling the



lungs and heart to act better. With these advantages are associated certain disadvantages arising from pressure—namely, œdema of the lower extremities, irritation of the bladder, venous congestion of the rectum, aggravating or producing piles, etc. These symptoms are of such a character as to indicate to the woman or the doctor that labor will soon set in.

**DURATION OF LABOR.**—If a woman be in labor thirteen hours, about ten hours will be consumed in the first stage, about two and a half in the second, and about a half in the third. It is impossible to tell how long labor will last. Young women from eighteen to twenty-five will have a comparatively short labor, and as the age increases the duration of labor is lengthened until at the age of thirty to forty labor may be prolonged with a primipara to two or three days if unaided by instruments. There is, however, no reason why such labor may not be accomplished safely. Young multipara will average about eight hours in labor; young primipara about twelve or sixteen.

The higher the advance in civilization, the more aid will be required by women in labor; the higher the walk in life, the more difficult will labor be.

A medical attendant should always be present at labor. If it is not normal, it can be recognized and corrected at once. Then there are the dangers of hemorrhage, rupture, malpositions, etc., which may become fatal if not attended to properly at once, and often are fatal in spite of the best that can be done.

**THE STAGES.**—*The first stage* consists in opening of the os uteri; the *second* in the expulsion of the child through the canal, and the *third* in expulsion of the after-birth (the placenta, membranes, etc.).

**FIRST STAGE.**—This stage occupies in the multipara about 9 or 10 hours; in the primipara about 12 to 14. This stage is the longest and most tedious to the woman because she can feel no progress. It varies in the rapidity of its progress with different women and at different stages.

It is a rule that dilatation of the os to one inch will occupy twice as much time as this degree later. The dilatation is caused by the longitudinal fibres contracting forcefully, and overcoming the contractive power of the circular fibres, and is assisted by the contents of the uterus being forced into the cervix, dilating it mechanically. The os is aided in its softening by exudation from the glands caused by pressure.

It is important to recognize the continuous dilatation of the os, as it is the one sure sign of labor.

While the woman is in the first stage of labor, before the dilatation has become great, she may be allowed to relieve herself by walking the floor, but after the os has dilated to the size of a half dollar walking is dangerous, and should not be allowed, as rapid dilatation may set in, allowing



the child to be expelled at once, possibly causing its injury or death, or inversion of the uterus, or both. During this stage the parts have become suffused with moisture and the vagina covered with mucus. The child is covered with vernix caseosa, the secretion of the sebaceous glands. By these means friction is prevented. The mucus in the vagina becomes tinged with blood, due to the separation of the bag and the dilatation of the os.

**SECOND STAGE.**—When the first stage is ended the bag of waters usually ruptures. If this does not happen in vertex cases it should be ruptured by the physician. Too early rupture is a thing to be deplored, as a dry labor results, which is always more tedious. The waters also prevent pressure on the child.

When the bag ruptures the water escapes sometimes with a gush. At other times, owing to the head being very near the os, only a portion escapes, the balance coming away at intervals. It commonly happens that the larger portion is retained until after the birth of the child. The rupture takes place sometimes over the vertex; at others at the side. Occasionally the child is born with a portion of the bag over its face, which is called being "born with a caul." This must be immediately removed, in order that the child may breathe. When the woman is examined, it must be determined also if the waters have ruptured. This is recognized by the fact that the sac will bulge at the os during a pain and will disappear when the pain goes off. If rupture has taken place the head will be felt, which is hard and unyielding, and remains the same after the pain goes off. In rupture of the bag the practitioner must be sure that he does not touch the head of the child.

While the child is being expelled its body undergoes certain movements, owing to the changes of shape in the canal. This stage occupies about 2 hours with multipara; from 3 to 5 with primipara.

**THIRD STAGE.**—This generally lasts about thirty minutes, and consists in the delivery of all else besides the child. It is sometimes prolonged to several hours. The doctor, after tying the cord, sits by the bedside and cups his hand over the uterus and makes gentle pressure. This assists in the firm contraction of the uterus and prevents hemorrhage, and is always a good rule. In about half an hour the woman reacts, pulse becomes all right, and the brain, etc., of woman become perfectly restored. The doctor should stay with the woman one hour; better an hour and a half, and until reaction has come on thoroughly.

**DELIVERY OF THE PLACENTA.**—This should take place naturally within half an hour after delivery of the child. It is seldom now that the physician waits for nature, but proceeds to expel the placenta after the manner known and described as Credè's. During the birth of the child, the placenta peels off from its attachment to the uterus, and at the com-



pletion of the second stage generally lies either protruding from the os or entirely in the vagina. A very common way of extracting the placenta with the ignorant and uneducated is to pull on the cord. This is very pernicious, because sometimes the placenta remains attached to the uterus, and pulling may cause inversion. Very few women recover from this accident. The best method is that of Credè. The placenta is expelled by grasping and making pressure on the uterus with one hand, while the other holds the cord, and makes only sufficient traction to guide it. If the placenta has not already peeled, pressure on the uterus will generally cause it to do so.

**LABOR PAINS.**—Pain is a constant associate to labor. When labor first commences the pains are of a bearing-down nature, felt most in the pelvis. As labor progresses, they are felt in the lumbar region, and radiating from there to the pubes. At first they are not severe enough to prevent the patient talking, reading, sewing, etc., but as they progress they become of the most severe character. While the os is dilating, they are of a nagging character, and as the patient feels no progress, she is apt to become discouraged and despondent; but after the os is fully dilated and expulsive pains commence, she gradually brings all of her voluntary forces to bear in assisting labor, and so becomes hopeful and resolute.

In the first stages of labor, the pains come on at long intervals, and as it progresses they become more frequent until at last they are almost continuous and grinding, and the inclination to bear down becomes irresistible.

**USE OF THE BINDER AFTER LABOR.**—If the binder is not used after labor it is, in our opinion, because of a want of proper appreciation of its value when properly applied.

It should reach from the hips to the waist and cover the abdomen. It should be pinned to fit tightly, and a compress should be placed over the uterus, especially if there has been hemorrhage. It is better to use two, and, after one or two days, one should be removed, and the other after three or four days more. The binder should stay on for one or two months until the parts have shrunk to about their normal state.

In surgery, after removal of a large quantity of ascitic fluid, the binder is used around the abdomen to prevent syncope, which is caused by engorgement of the veins. On the same principle the binder is used after labor, and cases of syncope occurring after labor, often fatal in character, may be due to the binder not being used. It also assists the uterus in contracting firmly, so preventing hemorrhage, and is especially indicated with women who have a hemorrhagic diathesis.

Besides these general reasons for the use of the binder, there are others of a special nature. If the woman has had an instrumental labor, requiring a good deal of manipulation, there is some danger of septic pois-



oning. If the binder is not used, this danger is increased, as under such circumstances the uterus and vagina holds a greater quantity of the fluid. The binder would compress the uterus and expel this fluid.

A woman cannot be confined without the loss of some blood. When delivery is forced as above, the amount is larger. After a loss of this sort, there is not so much blood in the veins, and, as these vessels have a great tendency to replace any such loss, they absorb fluid wherever it can be found, and in such cases this septic fluid may be absorbed. The binder by expelling the fluid prevents greatly its absorption.

The binder is also useful in preserving the shape of the woman, especially if she is disposed to have a pendant abdomen. In this case the uterus is liable to fall forward, causing an antiversion, which, in addition to the ills caused by a displacement, renders the patient liable to all the possible ills which may be caused in delivery, of obstruction, etc., due to the child's not being in the proper axis. It also produces a liability to malposition. The binder tends to prevent retention of urine, and the use of the catheter, because the bladder, under such circumstances, has not so much room to spread out, and is supported.

### The Child.

In from 7 to 9 hours after birth, after the mother has become rested, the child should be allowed to go to the breast.

*Markings on the head of the child* where the woman has been in labor for some time are usually of no importance, and will disappear after a short time. Elongation of the head is often a cause of anxiety to the mother, but it will after a time resume its natural shape.

*Yellowness of the child* often occurs 2 or 3 days after labor. If the eyes are not discolored it is not jaundice, but the discoloration comes from pressure and bruising during delivery, and will pass off. A yellow skin is not necessarily an indication of jaundice.

*Caput succedaneum*.—In tedious labor, where the waters have ruptured early, pressure often causes a tumor at the point of least resistance. This may be made at the ostium vaginae or elsewhere. When it occurs on the vertex it is not of any moment, and will disappear in a few days, but when it occurs on the face the consequences are often serious.

The caput succedaneum is not always on the presenting part. When it is made at the ostium vaginae the presenting part may be on the perineum.

**Care of the New-born Child.**—After birth the child should be well greased and washed with warm water and a mild soap. The cord should be dressed with two pieces of aseptic linen or absorbent cotton, with a hole cut through the centre. A small pad is then placed beneath the cord and another over it, and a snugly-fitting binder is applied, reaching from the hips to the armpits. About the fourth or fifth day the cord sloughs



off, and the umbilicus can then be dressed with bismuth or some other dry powder. The child should wear a bandage around its abdomen for one year to prevent occurrence of umbilical hernia. The only argument against the bandage is that it is thought by some that it might prevent symmetrical growth. This, however, ought not to be the case in a properly applied bandage.

The child should be allowed to nurse every two hours.

**RESUSCITATION OF CHILDREN WHEN BORN ASPHYXIATED.**—This sometimes happens in prolonged labor, etc. If it is observed that the child does not breathe readily, it should at once be given attention, as it is often a matter of life and death.

When the child is first born, contact with the air irritates its skin and makes it gasp for air. The child also breathes from instinct.

If the child does not breathe, or its breathing is embarrassed, the mouth should first be looked into to see that there is no obstruction from clots, mucus, etc. Cold water should then be sprinkled on its head and body. This is usually sufficient. The child should be kept always on its right side for reasons already given. If still the child does not breathe the finger should be put in whiskey and then in the child's mouth. A drop or two, which may be repeated, will answer. If there is no response to this the body should be rubbed with whiskey, and the feet and back should be spanked. Then it can be put in warm water, and then taken out and sprinkled with cold. If still the child does not breathe, artificial respiration should be performed. This is best done by mouth-to-mouth inhalation. The face is wiped off and a coarse towel is laid over it. The physician then covers the mouth and nostrils with his mouth and breathes into them. The air is forced out again by pressure on the thorax. Shultz's and Dew's are good methods of making artificial respiration, as also is that of Marshall Hall. As long as the heart beats there is hope.

The child may not breathe for 20 or 30 minutes, and yet recover. The rule is to attempt to resuscitate as long as the heart beats, or longer.

### **The Mother.**

**CONDITION OF THE BLADDER.**—The bladder of the woman in labor should always receive careful attention, in order to determine that it has been properly evacuated. Serious results often follow neglect of this precaution, due to distention of the bladder. The patient should urinate within 7 hours after labor. If she is not successful then, she should try again after a few hours, and if she is still unable to urinate it is proper to allow her to attempt to do so in the sitting posture, carefully supported by the nurse and protected from cold. If she fails in this, then she should be catheterized. It may be necessary to expose the parts in order to do this, owing to the swelling and displacement following parturition.



It sometimes happens that about a teacupful of urine will be passed, or it may dribble away, and still quarts will be left behind. It is, therefore, necessary that the physician should ascertain the condition of the bladder for himself by passing his hand downward over the abdomen.

**REST IN BED.**—After delivery the patient should remain in bed for at least nine days. If her condition at the end of that time is favorable, she should be allowed to sit up for half an hour on the first day, doubling the length of time each day after that until she sits up all day.

**DIET.**—For the first few days this should be of the simplest kind—chicken soup, milk, soda crackers, stale bread and toast, with perhaps an egg, being sufficient. After milk appears in the breasts, and there is no fever, the diet may gradually be increased to normal.

**MILK** comes in the breasts on the third day. On the morning of this day an aperient should be given. Should there be any tendency to inflammation, this may be given sooner. Castor oil is the best medicine for this purpose, given in tablespoonful doses. It acts in the same manner as a wad in a gun, thoroughly cleaning the canal. There is such a prejudice against oil that it is often necessary to disguise its taste in some way. This can be done by putting a tablespoonful of oil in three or four of sherry wine, and beating it up with a fork until it is finely divided. The mouth should be rinsed out before drinking with vinegar and again after drinking, and the breath should be held while it is being drunk. If these precautions are observed, the oil will not be tasted. The taste can also be disguised by taking it in soda water from a fountain, using the sarsaparilla flavoring.

**IRRIGATION OF THE VAGINA.**—There has been considerable dispute as to the propriety of this in labor cases. The old rule was that it should not be done, but with the advent of antiseptics, it became the rule to irrigate all. This is, however, not altogether safe, and there are many accidents which may happen when it is not done properly.

Septic matter may be introduced by using an old syringe. When it is necessary to use a syringe, it should always be new.

The point of the syringe may be introduced into the os of the uterus, and the fluid injected through the tubes into the peritoneal cavity. To prevent this, the bulb end of the syringe should only be introduced into the vulva. If a fountain syringe is used, the water should be allowed to run until it becomes warm and the air expelled.

In view of these possible accidents, it is proper to say that irrigation is not necessary if labor has been normal, and should only be used when labor has been prolonged, tedious, or forcible, or when there has been some laceration. The parts of the patient and the hands of the physician should be previously bathed in an antiseptic fluid. The pad with which the vulva is dressed should be made aseptic.



Blair's Chloral Thymol used in the proportion of ʒij to iv to the tea-cupful of warm water makes an excellent antiseptic for such purposes, or weak carbolic or bichloride solutions may be used.

THE BREASTS secrete a watery fluid called "colostrum" for the first two days. The child should be allowed to have this, as it is designed by nature to act as a purge for the newly born. Colostrum also keeps the mammary glands clean.

On the third day milk comes with such violence as to produce more than is needed for the child. The nurse should remove the surplus. If this is not done the excess will probably coagulate in the glands and may cause inflammation. This may form either superficially, in the inter-cellular tissue or deeply. The more superficial the inflammation the less danger there will be.

A mammary abscess should be treated in the same way as an abscess occurring anywhere else by incision and pressure and drainage.

FISSURES AND CRACKS IN THE NIPPLES.—These are usually caused by the child hanging on the breast after it has nursed, and macerating it. They may cause an abscess in the mammæ by continuity or absorption. They occur often in weak, phthisical women. In such women the following treatment should be used for a prophylactic: For three months before delivery, a coarse haircloth should be worn over the breasts. The friction caused by this serves to harden them. Then for a month the following lotion should be applied to the breasts twice daily, and allowed to dry:

R	Alum . . . . .	1 teaspoonful
	Green tea . . . . .	1 teaspoonful
	Whiskey or brandy . . . . .	2 tablespoonfuls

If in spite of such precautions the nipples have become sore, the following should be used:

A tablespoonful of quince seed is placed in a cup, and enough whiskey poured on to cover it. In twenty-four hours this forms a pulp. After nursing the nipple is washed with a linen rag and warm water, and then this is applied and allowed to dry.

Benzoated oxide of zinc ointment is also an excellent remedy to be used in such cases. If the crack is deep and does not heal readily, it should be touched with lunar caustic. If the patient suffers considerable pain, a 1% solution of cocaine may be applied, and allowed to remain in contact for five minutes. In using such things great care must be taken that none is on the nipple when the child nurses again.

Compound tincture of benzoin rapidly heals the parts, but it has the disadvantage of being very hard to wash off, and adheres with great tenacity to anything with which it comes in contact.

Kent's nipple shield is an excellent device.



The general health should always be looked after.

PREPARING THE BED FOR LABOR.—The bottom sheet on the bed should be folded back on itself from the foot until the folded edge reaches about to the patient's waist, the two edges reaching to the head of the bed. Another sheet is then spread over the uncovered portion of the bed, and beneath this are placed several thicknesses of worn blankets or counterpanes. These should be placed so that they will be beneath the patient's hips, and allow considerable margin. Beneath these should be placed a rubber sheet. The patient's night-dress should be tucked up under her armpits, and an old clean skirt pinned around her waist.

After delivery, this skirt and the worn sheet and blankets are removed and thoroughly boiled and washed. The sheet which was folded back and the night-dress are then pulled down into place, and the woman is allowed to sleep.

It is needless to say that anything which has been in any way soiled during delivery, should never be allowed to remain, but be removed, and clean aseptic material of same character substituted for it.



## CHAPTER X.

### MECHANISM OF LABOR.

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Several terms which will be frequently used in discussing this subject are defined as follows:

*Contraction of the uterus* is a term employed to signify the contraction of the muscular fibres of the uterus.

*Retraction* signifies the condition when the muscles are held contracted. *E. g.*, after the child is expelled the uterus undergoes a contraction, and then for a space of time remains retracted, when it contracts again.

*Bandl's ring* or *Bandl's contraction ring* is the name given to the dividing line between the thick and thin portions of the uterus. This may rupture after it has become exceedingly thin.

*Presentation* applies to that part of the child found in the centre of the parturient canal.

*Position* refers to the relation of the child's body to that of the mother.

#### **Presentations.**

The child is usually born with either the head or breech foremost, but is sometimes found oblique or crosswise in the uterus. The head most commonly comes first, 96 out of 100 cases being of this variety. The breech occurs next in frequency, while cross presentations are the least frequent.

The head may come first with either the vertex, face, or side of the head presenting.

The breech may come first with the spinal column looking either forward or backward. Feet and knee presentations are classed with breech cases because their mechanism is essentially the same.

The child may lie crosswise, with either the right or left shoulder presenting, and with the spine looking either forward or backward.

#### **Head Presentations.**

**VERTEX VARIETY.**—The pelvis, besides being divided into anterior and posterior inclined planes is further divided by a median antero-posterior line. This division cuts the pelvis into four segments, which are known as the left and right anterior and right and left posterior.

Vertex presentations are those in which the vertex is found in the centre of the parturient canal. The child being born with the vertex presenting



may lie in four different positions, the name of the position being derived from the segment in which the occiput of the head lies. The obstetrical vertex has already been described.

Vertex presentations are named as follows:

*First position.* Occiput looks toward left acetabulum, and lies in the first segment of the pelvis.

*Second position.* Occiput looks toward right acetabulum, and lies in the second segment of the pelvis.

*Third position.* Occiput looks toward right sacio-iliac joint, and lies in the third segment of the pelvis.

*Fourth position.* Occiput looks toward left sacio-iliac joint, and lies in the fourth segment of the pelvis.

If the occiput lies anywhere in one of these segments, the child will be born with the same mechanism as if it were looking precisely as described above.

#### FIRST POSITION OF VERTEX PRESENTATION.

When the vertex presents in the first position, the occiput looks toward the left acetabulum; the bregma toward the right sacro-iliac joint; the right parietal boss toward the right acetabulum, and the left parietal boss toward the right sacro-iliac joint. Seventy-five out of a hundred vertex presentations are in the first position.

*The reasons for this, the first, position occurring more frequently* are as follows:

First. The occiput and spinal column being the heaviest portion of the child, naturally seek the most dependent part of the uterus, which, when the woman is in the standing posture, is the anterior wall.

Second. The spinal column of the child being curved, naturally accommodates itself to the curved anterior wall of the uterus. The movements of the child, to a certain extent, assist it in assuming this position, but it is due principally to the laws of mechanics.

Third. The encroachment forward of the promontory of the sacrum, throws the child against the anterior wall of the uterus.

Fourth. The head is prevented from getting into the fourth segment by the presence of the rectum and sigmoid flexure.

**DIAGNOSIS OF POSITION.**—In order that the position of the child may be determined, the woman should be examined. This should be suggested while she is in pain, as it is then apt to be less repulsive to her. The hands should be cleansed and disinfected, and the index finger anointed and introduced until it reaches the os. The head is then felt for. The first thing which can be felt is the sagittal suture, then portions of the parietal bones on either side. Examination should not be conducted during the presence of a pain, as it might cause rupture of the bag of waters. By following the sagittal suture backward, the anterior fon-



tanelle can be outlined and recognized, and by following it forward, the posterior fontanelle can be recognized.

*The child in being born* passes through two bony and two fleshy constrictions. The two bony are the superior and inferior straits; the two fleshy the ostium uteri and ostium vaginæ.

**MOTIONS OF THE CHILD.**—The child in being born undergoes the following motions: 1, flexion; 2, descent; 3, rotation; 4, extension; 5, restitution; 6, external rotation; 7, birth of the body of the child.

When the bag of waters ruptures, the head impinges on the os uteri, and the uterus contracting makes the head flex (1). In the centre will be found the posterior fontanelle which remains in the centre until the child is born. The continuous contraction of the uterus drives the head past the os and into the cavity of the pelvis (2), and this being larger, the head pauses and partially extends, assuming the demi-flexed position. The pause is only momentary, and the uterus continuing to contract the head is forced onward, and again becomes fully flexed.

The occiput then rests on the left anterior inclined plane; the bregma on the right posterior inclined plane. The occiput being the more prominent, controls the movement of the head, which being forced onward by the uterus, the occiput is directed by the inclined plane from the side to the anterior part of the pelvis, causing the head to rotate (3) to and under the arch of the symphysis. While rotating the head also descends, and the vertex impinging on the perineum, is arrested in its course downward and directed forward to the ostium vaginæ. This causes extension of the head (4). Four and five therefore occur together. The head is now at the inferior strait, with the neck under the arch of the symphysis, and the bregma at the coccyx. The pains continuing, the head is born by extension.

While the head is undergoing these movements, the neck twists while the body remains in the same position. When, therefore, the head is released from the grasp of the parts by being born, it springs back to its normal position in relation to the body, undergoing the movement of restitution (5). The vulva then closes on the neck of the child. At this point the finger should be put into the mouth of the child to clear it of any mucus, and if the cord is around the neck, it should be loosened.

The body now rests with the right shoulder on the right anterior inclined plane; the left shoulder on the left posterior inclined plane. The right shoulder is rotated under the arch of the symphysis, causing external rotation of the head (6), and the left shoulder sweeping the floor of the perineum, they are born simultaneously. After the birth of the shoulders, the rest of the body follows at once (7).

**SUPPORTING THE PERINEUM.**—During the birth of the head, the perineum should be supported by grasping up as much tissue as possible on



either side of the vulva, with the right hand, and drawing it together. This brings additional tissue to the aid of the perineum, making a gutter, so to speak, and permits it to stretch to its fullest capacity, and lessens materially the danger of a tear. Any other method of preventing rupture is futile. It has, however, been determined by observation that tears in the perineum are most often caused during the birth of the shoulders, due to the shoulder buttoning into the edge of the perineum. This can be prevented by inserting one or two fingers between the shoulder and the perineum, allowing them to act as a sliding wedge.

*The different motions* undergone by the child during parturition are of the most beneficent nature. Flexing of the head makes birth easier, by causing the two smallest diameters possible to engage—the biparietal and cervico-bregmatic.

In a normal case the head is a tight fit in the pelvis, and is born by undergoing the motions described. If these do not occur, it is because either the child's head is abnormally small, or the mother's pelvis is abnormally large.

The motions of the head in descending make what is called the screw of the pelvis.

Rotation of the head is commenced on the bones of the pelvis, and continued by the muscles forming the floor.

Throughout labor the cervico-bregmatic diameter remains parallel to the straits of the pelvis, and the occipito-mental parallel to the axis of the straits.

The posterior fontanelle is the presenting part after the rupture of the bag of waters, and remains so throughout labor, although a caput succedaneum may occur elsewhere.

In this labor the head does not turn more than a quarter of a circle on the neck. In other labors it often turns more than this, and where it is necessary for it to be done, the head can generally be turned more with safety, as the ligaments of the neck are as a rule strong enough to turn the body.

*The first and second positions of the vertex are the very best for both the mother and child.*

First. The head being hard and firm, is the best part for dilating.

Second. The largest part of the child being born, the balance follows easily.

Third. The spinal column is nearly straight, and the expulsive forces of the uterus and abdominal muscles are communicated directly to the head from the portion of the child remaining in the uterus.

Fourth. As the neck engages under the arch of the symphysis, the head has to travel a less distance, the difference being as much as the difference between the length of the anterior and posterior walls of the vagina.



Fifth. The greater length of the child being in the uterus, and the placenta not being torn off, the child is nourished better, and nourishment from the placenta is not prevented by pressure on the cord.

This position should be thoroughly studied, in order that unfavorable positions may, if possible, be converted into it.

**SECOND POSITION OF THE VERTEX.**—When the bag of waters ruptures, the occiput looks toward the right acetabulum; the bregma to the left sacro-iliac joint; the left parietal boss toward the left acetabulum, and the right parietal boss toward the right sacro-iliac joint.

The same forces and same points of resistance occur in this position as in the first, the only difference being that the occiput looks toward the right instead of the left, and must rotate from right to left, while the shoulder rotates from the left to the right.

The second position occurs only about 18 times in 100 vertex cases, owing to the position of the sigmoid flexure and rectum. Probably this position occurs so often because doubtless many cases of second position have been converted by nature from the third.

The third position is thought by many to be next in frequency after the first.

Third and fourth position should always be converted into the second and first, respectively.

The position of the child should always be studied carefully, as intelligent conduct of labor is dependent on a correct diagnosis. Forceps cannot be applied with success unless the position is known, and many positions and presentations may end fatally unless they are recognized and corrected in time. Sometimes, however, though rarely, diagnosis is akin to impossible from causes too numerous to here relate.

**THIRD POSITION OF VERTEX.**—The occiput looks toward the right sacro-iliac joint, the bregma toward the left acetabulum, the right parietal boss toward the left sacro-iliac joint, the left parietal boss toward the right acetabulum.

The head is flexed, and the same diameters are engaged in passing through the os uteri and the superior strait, and no difficulty is experienced in the head passing into the cavity of the pelvis. Here, it is said that, in 28 cases in 30, the head is forced anterior to the spine of the ischium by the promontory of the sacrum. This is favored by the fact that the anterior segments are larger than the posterior. When the occiput passes anterior to the spine of the ischium the third position is converted into the second. It is possible for this to take place voluntarily only while the parietal bosses are approaching the spines of the ischia. After these are passed in the third position the physician should change if he can. This, however, is very difficult.

If the third position is converted into the second the head undergoes



the motions of the second position. The only difficulty is that the occiput has to turn nearly half a circle to get under the arch of the symphysis.

Sometimes this can be done without injury; at others the ligaments connecting the spine with the head are so strong as to turn the body before it engages in the pelvis.

IN THE FOURTH POSITION, practically speaking, the same conditions occur as in the third, and it is as frequently converted into the first position.

It is the duty of the practitioner, however, to in no case consider natural conversion invariable, although very generally it is; but he should aid nature in converting before the spine of the ischium is reached, and insure the conversion.

MANIPULATION OF CONVERSION.—The finger is placed on the parietal boss which looks backward, and as the pains progress the occiput is pushed forward into the second or first position, as the case may be.

The vectis is the proper instrument if one is needed, and the finger not strong enough.

If the vectis cannot be gotten conveniently, one blade of the forceps can be used.

MECHANISM WHEN THE HEAD IS DELIVERED WITH THE OCCIPUT POSTERIOR.—Only in recent years has this been classed with normal labor. Although it is generally true that such a labor will be normal, there are many exceptions.

The child begins to pass in the canal with the head demi-flexed. The pains continuing the head is fully flexed as it passes through the os uteri, and the posterior fontanelle presents, and the cervico-bregmatic and biparietal diameters are the ones engaged. There is no difficulty in passing through the brim of the pelvis, and the head enters the cavity. Here there is a lull in the pains, and the head becomes demi-flexed. The pains recurring, the head again becomes fully flexed. So far the movements have been the same as with the occiput anterior; hereafter they are entirely different. The pains continuing, the child is forced onward and the occiput impinges against the right posterior inclined plane, and rotates into the hollow of the sacrum. The head on the floor of the pelvis strikes against the sacrum, coccyx, and perineum; and striking against these hard parts as it is forced along, the head flexes more strongly on the chest. The bregma finally engages under the arch of the symphysis, and the posterior aspect of the head is forced along the floor of the perineum, flexion increasing all the while. When the cervico-bregmatic diameter reaches the vulva, the neck will be at the posterior commissure, the bregma at the anterior. The posterior commissure then becomes the fulcrum, and the head is born by extension. As soon as the head is born the perineum shoves the head up and restitution takes place.



When the head is forced down so low in the pelvis, part of one shoulder is drawn down also.

Hodge teaches that the head flexes on the neck, so that the diameter engaged is the cervico-bregmatic plus that of the neck. Others think part of the thorax engages instead of the neck.

**FOURTH POSITION OF VERTEX.**—If the third has been learned the fourth is known also. The only difference is that the occiput rotates from left to right, while the left shoulder rotates from right to left. The shoulders rotate in an opposite direction to the head.

#### DISADVANTAGES OF THE POSTERIOR POSITION.

In posterior positions the spine being curved, much force is lost, as the spine becomes more curved as more force is applied.

In anterior cases the occiput moves naturally toward the opening, and has to travel a distance of only  $2\frac{1}{2}$  inches. In posterior cases the opening is reached with difficulty, and the occiput has to travel 8 or 9 inches.

Flexion is extreme, and more difficult to be performed.

The nape of the neck fits nicely under the arch of the pubes; the bregma does not.

Greater distention of the perineum makes laceration more frequent and severe.

The agony of parturition is greater, power and work are lost, and injuries are greater.

Occasionally the bowel is ruptured by laceration of the perineum extending to and into the gut. The perineum is met at right angles by the occiput, and thus offers more resistance. The child often dies; the mother often gets worn out.

Flexion should be aided by the finger in rectum. If necessary, the forceps should be applied.

**Face Presentations.**—It was formerly thought that these could not be classed with normal labor, but it is now a recognized fact that these cases are generally normal. Face presentations occur only about once in 250 cases. They are accounted for by the supposition that the child moves its head back, and it is forcibly retained, or for some reason unknown, remains so.

*Where possible, all face presentations should be converted into vertex,* although there are many cases where this cannot be done, either because they are seen too late, or owing to some other difficulty.

Although the brow or the malar process may be the first thing that can be felt, when examination is first made; when the head becomes fully extended in labor, the nasal bone is found in the centre of the parturient canal, and is the presenting part. There are *four positions*, with the spinal column looking in the same direction as in vertex cases. These



cases are almost as safe as vertex when the occiput is posterior, but not quite. They can almost always be safely delivered, and should always be conducted in a normal, natural way if possible.

**FIRST POSITION OF FACE PRESENTATION.**—After the waters have ruptured and the head has become engaged, the bregma looks toward the left acetabulum; the chin toward the right sacro-iliac joint; the right malar bone toward the right acetabulum, and the left malar bone toward the left sacro-iliac joint.

The escape of waters is usually very complete, as the face does not thoroughly plug up the os uteri, and there is very little post water.

**DIAGNOSIS.**—A face presentation is not difficult to recognize. The eyes, nose, forehead, and mouth can be easily outlined. The diagnosis is sometimes settled by introducing a finger into the mouth.

Before the waters rupture, the head is demi-extended, but after they rupture and the head engages, it becomes fully extended, the occiput being pressed into the back of the thorax.

The pains continuing, the head is forced on into the cavity of the pelvis, where it again becomes demi-extended.

The first diameters engaged are the fronto-mental, 3 inches, and the bi-malar,  $2\frac{1}{2}$  inches.

When the head passes further on, the diameters are the trachelo-bregmatic and the biparietal, each  $3\frac{1}{2}$  inches. The occipito-frontal diameter remains parallel to the axis of the pelvis, assuming that the case is one in which it will remain in the position in which it started. When the head is in the cavity of the pelvis, the chin, being the most prominent part, rests on the right posterior inclined plane; the forehead on the left anterior. The chin is rotated into the hollow of the sacrum, and the forehead under the arch of the pubes.

As the head is forced on there is a disposition for the chin to sweep the floor of the perineum, bringing down the thorax with it. This would make the diameters engaging the cervico-bregmatic  $3\frac{1}{2}$  inches, plus the thorax, 2 inches—a deadlock. The child cannot be born this way.

The same remarks apply to the second position, the only difference being that the chin then rests on the left posterior inclined plane, and is rotated from left to right.

While in vertex cases first and second positions are the most favorable, and the third and fourth difficult, in face cases the third and fourth are most favorable, while the first and second are impossible. However, in face cases nature rarely keeps the child in the first position, but almost always converts it into the fourth, and the second into the third.

**THE CHIN POSTERIOR CASES ARE USUALLY CONVERTED BY NATURE,** because the anterior segment of the pelvis is larger, and the promontory of the sacrum projecting forward, tends to direct the child into the ante-



rior segment. The wedge-shaped face of the child, having the smallest diameters forward, favors its being caught anterior to the spine of the ischium. When the chin engages anterior to the spine of the ischium, the first position is converted into the fourth, and the third into the second. About 96 out of 100 cases with the chin posterior are by nature converted this way. Unless this happens, or is made to happen, delivery cannot take place.

MANIPULATION.—The physician should leave nothing to chance or nature, but should proceed to assist or make the conversion himself, and thereby assure the change. A finger is placed on the child's temple, and it is pressed backward. This manœuvre brings the chin forward, and causes it to engage anterior to the spine of the ischium.

THIRD POSITION OF FACE.—When the waters rupture and the head engages, the bregma looks toward the right sacro-iliac joint, and the chin toward the left acetabulum. Extension becoming complete, the face and head descend into the cavity, when the chin rests on the left anterior inclined plane, and the bregma on the right posterior. The chin is rotated by the left anterior inclined plane to under the arch of the pubes, and engages there. The trachea acting as a centre, the forehead sweeps the perineum, and is born by flexion as far as the vulva, when the neck engages on the posterior commissure, and the head is born by extension.

FOURTH POSITION OF FACE.—The bregma looks toward the left sacro-iliac joint, and the chin toward the right acetabulum. The mechanism is the same as in the third, only the chin is on the opposite side, and rotates in an opposite direction.

THE PRINCIPAL INDICATION IN FACE CASES is to bring the chin under the arch of the pubes. If it goes into the hollow of the sacrum, it makes an impossible labor.

DISADVANTAGES OF FACE PRESENTATIONS.—Because of the limited risk that the first and second positions may not be converted, the prognosis is generally said to be not so good.

It is not so favorable, also, because the face is dragged along after the neck, and the spinal column flexes, thus causing the woman to expend more force uselessly.

*Caput succedaneum.*—When this occurs on the scalp no injury is done, but when it occurs on the face, the child is usually born with a livid countenance. This, however, generally subsides, but the parts have been known to become gangrenous and slough.

Constriction of the os sometimes presses so on the nerves of the face as to cause facial paralysis. Also, bending so far back, presses on the vessels of the neck, especially the jugular veins and sometimes the carotid arteries. The circulation of the brain may in this way be interfered with or shut off, and is liable to kill the child.



Even when the chin rotates anteriorly death is frequent, statistics say one in seven of such cases ending fatally.

**MANAGEMENT OF A CASE WHERE THE CHIN HAS ROTATED INTO THE HOLLOW OF THE SACRUM.**—There is but one thing to do, and that is to endeavor to bring the chin forward. This should be first attempted with the finger, and if that is not sufficient the vectis or one blade of the forceps can be used.

When seen early enough no face case should be left as such, but should be converted into a vertex. The fact that the woman may be unable to complete the delivery is no reason for not attempting this, as then the child can be delivered by forceps. After the conversion is made the head should be held in this position with the fingers until it becomes engaged in the os. If the conversion cannot be made completely, at least the head may be gotten obliquely, so that the prominences will be against the obturator and sacro-sciatic foramina. It is said that when the chin is in the hollow of the sacrum that the head can surely be gotten down with the fillet or vectis. But in no case should the barbarous attempt be made to pull out the head with forceps. It is better to resort to crushing of the head.

**Breech Presentations.**—These occur from 3 to 5 times in 100 cases. They were originally classed with dystocia, but are now with eutocia. Assistance in these cases often makes matters worse, and meddling midwifery is a term often here well applied.

Even when these are of the most favorable character, 1 to 10 of the children are liable to be still-born, although it is thought that now that the mechanism is better understood the mortality should be less. A breech presentation is generally due to some want in the normal conditions of pregnancy, such as death of the fœtus, hydrocephalus, or the voluntary motion on the part of the child, something occurring to excite it. Remaining unchanged in this position, it soon becomes confined in it so that it cannot return to its former position. If the woman assumes the recumbent position for any length of time it favors a breech presentation.

**THERE ARE TWO CLASSES** of breech presentations—*regular* and *irregular*.

In the *regular* class the breech presents first.

In the *irregular* class either a knee or foot comes first.

Prior to a few years ago foot and knee presentations were lectured upon separately, but they are now classed with breech cases, as presenting by them does not influence the motions of the child in delivery. It is only when the breech engages that the motions commence.

When the knee presents, however, the case is not as favorable as in a regular breech case, and when a foot presents the case is still more unfavorable, because of the risk of premature rupture of the bag of waters.



THE BREECH IS NOT AS FAVORABLE A PRESENTATION as the vertex. The reasons for this are that the parts being irregular, make a more irregular sac of the bag of waters, and being also soft and, proportionately speaking, small, it does not distend the os as well as the vertex. These remarks apply with greater force when the knee presents, and still greater when the foot presents. Then there is a long irregular bag of waters.

It is important to preserve the bag of waters to the last minute, contrary to the teaching in vertex cases. In vertex cases the cord is not much pressed upon, but here it is, so that it should be protected by the waters as long as possible. It is very hard to do this, especially when a knee or foot presents. Kicking of the child often ruptures the bag.

THE POSITIONS are named in the same way as in vertex and face, the spinal column maintaining the same position in reference to the mother, the only difference being that the child is in the reverse position.

FIRST POSITION OF BREECH PRESENTATION.—When the breech first engages, the sacrum looks toward the left acetabulum, the pubes toward the right sacro-iliac joint, the left tuberosity of the ischium toward the right acetabulum, the right tuberosity toward the left sacro-iliac joint.

DIAGNOSIS is considered easy. It is said that position can be diagnosed by palpation, but if the woman is moderately fat this is either difficult or impossible.

The foetal heart is said to be higher up.

The true way of diagnosing is *per vaginam*.

On introducing the finger two moderately soft buttocks can be felt with a sulcus between them. Sometimes the buttocks are hard and tense, but if the sulcus is confounded with the sagittal suture they can be differentiated by tracing out the fontanelles in vertex cases, and finding a dimple in the breech corresponding to the anus. If necessary the finger can be introduced, bringing out some meconium, though it is not generally desirable to do so.

There is also more likelihood of some meconium escaping into the waters.

In most cases the finger can be passed between the thighs and feel the organs of generation.

BIRTH OF THE BREECH.—The diameters of the breech are so small that there is no difficulty in its passage. The parts being compressible, these diameters can be diminished.

It meets, however, with some resistance, and the uterus pressing downward, causes the chin to flex on the thorax. This position is retained throughout the birth of the child. The central part in the parturient canal is the coccyx.

When the thorax and head come down, the same diameters are engaged as in vertex cases, and the occipito-mental diameter remains parallel to the axis of the canal.



The breech having passed through the brim of the pelvis and the os, reaches the floor of the pelvis. There has been much discussion as to whether the hips come down together. It is evident that they do. The left hip rests upon the right anterior inclined plane, and is rotated under the arch of the pubes. The right hip rests against the left posterior plane, and is rotated into the hollow of the sacrum.

The left hip, catching under the arch of the pubes, the right hip sweeps the floor of the pelvis, and at the inferior strait, the left hip lies under the arch of the pubes, and the right at the coccyx. At the vulva the left hip is at the anterior commissure, and the right at the posterior, and both are born simultaneously. There has been much discussion as to which hip is born first, but it is evident that they are born simultaneously. When the hips are at the vulva, the shoulders are at the brim of the pelvis. Because of the rotation of the hips, there is a twist in the body, and also a curve corresponding to the curve of the parturient canal. It is just while the child is in this position that the unwise practitioner will do something wrong. It is just here that the term meddlesome midwifery applies with great force. The child should not be pulled upon. If so, the result will be that the child will be pulled along faster than the uterus contracts, leaving a cavity in the uterus, so that the arms which have been held down by the side by the circular fibres of the uterus will be relaxed, and, impinging against the os uteri and bones of the pelvis, are liable to pass up by the head, adding to the diameter of the head the diameter of the two arms. This makes an impossible delivery. If let alone, the circular fibres will generally hold the arms firmly down by the side, and they will be born in that position.

The breech being born it undergoes restitution, and assumes an oblique position.

*Birth of the Shoulders.*—The shoulders now engage in the brim of the pelvis. The right shoulder looks toward the left sacro-iliac joint; the left shoulder toward the right acetabulum; the sternum toward the right sacro-iliac joint; the spinal column toward the left acetabulum.

Passing through the canal the left shoulder rests upon the right anterior inclined plane, and is rotated under the arch of the pubes, while the right shoulder rests upon the left posterior, and is rotated into the hollow of the sacrum, and sweeps the perineum. The spine now looks toward the left tuberosity of the ischium, and the sternum toward the right.

At the inferior strait the left shoulder is under the arch of the pubes; the right at the coccyx. At the vulva the left shoulder is at the anterior commissure; the right at the posterior, while the spine looks toward the left labium, and the sternum toward the right. Both are born simultaneously, and restitution takes place.

*Birth of the Head.*—While the shoulders are being born, the head



engages in the brim of the pelvis. The shoulders rotating cause a twist in the neck, and the curve of the canal causes a concavity.

The head is engaged flexed, and the chin is in the centre of the canal. The diameters engaged are the same as in the vertex. The occiput looks toward the left acetabulum; the bregma toward the right sacro-iliac joint; the right parietal boss toward the left sacro-iliac joint; the left parietal boss toward the right acetabulum. The occiput resting on the left anterior inclined plane determines rotation to under the arch of the pubes. The head rotating causes the body to rotate externally.

The bregma is rotated into the hollow of the sacrum and sweeps the floor of the perineum. At the inferior strait the nape of the neck lies under the arch of the pubes and the bregma at the coccyx. The head is then born by flexion.

**MANAGEMENT IF THE ARMS HAVE GONE UP.**—If the arms have gone up they are usually found against the temples. Occasionally they are behind the parietal bosses. They must be brought down the same way they have gone up, whether anteriorly or posteriorly. The rule is to bring down the sacral arm first, as there is more room. The hand that is most dextrous should be used for this purpose. The hand is passed up along the spine, and the thumb inserted into the axilla while the first two fingers are placed along the whole length of the humerus and used to bring it down.

The thumb prevents dislocation and the fingers fracture. Under no circumstances should an attempt be made to bring down the pubic arm while it is in that position, but the child should be turned until this arm lies toward the sacrum, when the same manœuvre can be practised. After bringing down this arm rotation should be continued until the occiput becomes anterior. This is Winckel's method. There is little or no danger in turning the child, and if the attempt were made to bring down the pubic arm in that position it would make a bunglesome operation, and consume much time.

After the child is born all except the head, there is no part of it in the uterus, so that delivery must take place without its aid by contraction of the abdominal muscles.

As long as the head remains flexed, the diameters engaged are the best. But the head being in the parturient canal the child is unable to breathe, and the placenta being partially, or altogether, peeled off and the cord compressed, nourishment from this source is impossible. Under these circumstances, unless the head is born within five minutes, the child will die.

The woman should be called upon to bear down with all her force, and this is usually successful in expelling the child. *Do not pull*, as this would change the diameters from the cervico-bregmatic ( $3\frac{1}{2}$  inches) and bipa-



rietal ( $3\frac{1}{2}$  inches) to the occipito-frontal (4 inches) and biparietal, and if traction is continued it will cause the occipito-mental (5 inches) to engage.

The head should be extracted where the woman needs assistance by taking the body of the child in the hands and shoving the head up and making flexion to bring the most favorable diameters to engage. If the head is not expelled then the body is carried over the pubes, or the fingers are placed on the malar bones on either side of the head, and expulsion facilitated. We do not recommend to put the finger on the lower jaw, as it is too fragile, but the finger can be put in the rectum of the woman, or pressure made with one hand on the fundus of the uterus. If these means are not sufficient the forceps should be applied.

It has been suggested that the vulva be held away from the mouth of the child so that it can breathe, but it is doubtful if this can be successfully done.

**SECOND POSITION OF BREECH PRESENTATION.**—The sacrum looks toward the right acetabulum, the pubes toward the left sacro-iliac joint, the right tuberosity of the ischium toward the left acetabulum, the left tuberosity toward the right sacro-iliac joint.

The mechanism is the same as in the first position, except that the rotations are in the opposite direction. It is much more frequent than the first.

**THIRD POSITION OF BREECH PRESENTATION.**—The sacrum looks toward the right sacro-iliac joint, the pubes toward the left acetabulum, the right tuberosity of the ischium toward the right acetabulum, the left tuberosity toward the left sacro iliac joint.

There is little or no difficulty in the birth of the hips. They pass into the cavity of the pelvis, the right hip strikes on the right anterior inclined plane, and is rotated under the arch of the pubes, the left hip strikes on the left posterior inclined plane, is rotated into the hollow of the sacrum and sweeps the perineum, and both hips are born simultaneously. The shoulders come down, strike the same planes, rotate in the same directions, and are born simultaneously.

Restitution takes place after each part is born.

*Passage of the Head.*—There is very great disposition here for the third to become converted into the second as in vertex cases. When the occiput strikes anterior to the spine of the ischium, the head is born in the same way as in the second position. But if the occiput strikes posterior to the spine of the ischium, it rotates into the hollow of the sacrum, and looks posterior, while the bregma looks anterior, and rotates under the arch of the pubes, and engages there. The occiput sweeps the perineum until the neck reaches the posterior commissure of the vulva, when it engages there, and the bregma is born by flexion. This birth can be facilitated by bringing the back of the child toward the spine of the mother.



FOURTH POSITION OF BREECH PRESENTATION.—The sacrum looks toward the left sacro-iliac joint; the pubes toward the right acetabulum; the right tuberosity of the ischium toward the right sacro-iliac joint; the left tuberosity toward the left acetabulum.

The mechanism is the same as that of the third position, except that the rotations take place in an opposite direction.

In ninety-five per cent. of breech cases occurring in the third and fourth positions, they are converted into the second and first, respectively. Hence the first and second positions are the most favorable in breech presentations as they are in vertex. It is also as important to convert the third and fourth into the second and first when the head is being born.

#### DISADVANTAGES OF BREECH PRESENTATIONS.

(1) The breech is the smallest part, the shoulders the next, while the head is the largest. There is, therefore, a separate dilatation with each, and, consequently, a continual delay.

(2) The breech being soft and irregular, does not dilate the os so well.

(3) The circulation of the child is not so well maintained. The cord is compressed, and the delay causes it to be compressed for a long time, while the placenta is generally peeled off before the child is born.

(4) Irregularity of the breech may allow the cord to become prolapsed.

(5) The air irritates the skin of the child, and causes it to gasp, often drawing in mucus, blood, etc., and drowning it.

(6) The great danger of displacement upward of the arms and extension of the head.

In births by the breech the different portions of the body as the child is born should be wrapped in a warm, soft cloth. Sometimes when assistance is necessary the blunt hook, the fillet, or the forceps can be used, of which the scope of this work will not permit more than brief mention.



## CHAPTER XI.

### DYSTOCIA.

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This term applies to those cases in which safe delivery of the child cannot be accomplished by the mother, but where it becomes necessary for the physician to interfere. The operations which he may be called upon to perform are divided into two classes—those in which the hand alone is used, and those in which the hand is armed by some instrument.

#### Operations Performed by the Hand Unarmed.

In order that the child may be safely delivered, one of its extremities must present. In some cases the child is situated crosswise in the uterus, presenting neither extremity. In such position delivery is of course impossible. These are termed by different authors variously, cross, oblique, or irregular presentations. They are nearly always converted into shoulder presentations.

**Shoulder Presentations.**—There are four ways in which the child may lie, which occur in frequency according to the following order:

- 1st. Head in *left* iliac fossa; spine forward. 48%.
- 2d. Head in *right* iliac fossa; spine forward. 43%.
- 3d. Head in *right* iliac fossa; spine backward.
- 4th. Head in *left* iliac fossa; spine backward.

It will be observed that almost invariably the spine looks forward. This occurs because the curve of the spine corresponds to the curve of the anterior uterine wall, and, therefore, naturally assumes the position in which it fits best; and, again, as the spine is heavier and the abdomen more or less dependent, the force of gravity tends to make it assume this position.

The first occurs more frequently than the second, there being a disposition for the head to be to the left.

The reasons given for the spine being forward cause the second to be more frequent than the third. The third occurs more frequently than the fourth, because of the rectum and sigmoid flexure.

Shoulder presentations occur once in 130 to 150 labors. Formerly, the percentage was given as much smaller than this, but the difference is due to the fact that physicians are now better able to diagnose positions. After the bag of waters is ruptured, nature tends to convert these into vertex or face cases, and this change often took place without being noticed.



CAUSES OF CROSS POSITIONS.—The movements of the child may account for it, as the child may move and become fixed.

A contracted pelvis may modify the position of the child; as also may attachment of the placenta low down, by altering the shape of the uterus, and pushing the child to one side.

Large children are more frequently oblique than small, so it occurs more frequently with males than females. In multiple pregnancy it occurs very frequently.

A previous irregularity in position seems to generally cause another, as the shape of the uterus appears to be permanently altered by the mal-position.

Monstrosities, or children with tumefactions are apt to have irregular positions.

Premature birth is a very frequent source.

Other causes are poor development of the child, prolapsed extremities, hydrops of the amnion, maceration of the fœtus, pendant abdomen in women who have not been properly bandaged in previous confinement, blows and jostling, and retching from excessive vomiting and long continuance in the recumbent position.

DIAGNOSIS.—This presents, comparatively speaking, little difficulty, and should be made before the rupture of the bag of waters. The child does not lie so low in the pelvis, so sometimes there is difficulty in reaching the uterus.

The os is irregularly opened by the shoulder, and the sac is oblong and irregular. On inserting the finger the shoulder is felt, and the finger can be put in the axilla. This is distinguished from the mouth or anus by feeling the shoulder blade and the humerus, which can be felt for its whole length.

It has been said that if there is any doubt, the bag of waters can be ruptured, and the presenting part brought down and examined, but this is not good practice, unless operative procedure is immediately proceeded with, as it diminishes the chances for the life of the child, and causes the uterus to contract so as to prevent necessary manipulations of the child.

The foot can be told from the hand, because the thumb can be abducted and the big toe cannot.

If still the part cannot be made out, it can be brought down and looked at. Such a procedure, however, ought not to be necessary. Can tell which hand it is by shaking hands. The hand with which this can be done belongs to the same side as the hand employed. It is said that the position can be diagnosed by the hand, but it is better to pass the finger up beside it and make the examination.

DELIVERY.—In this connection it is well to define the terms spontaneous version and evolution.

*Spontaneous version* is where the child changes its position before it



engages; *spontaneous evolution* is where it changes its position after it has become engaged.

The delivery of a living child in a cross position, without changing it, is impossible. Something must be done to effect a safe delivery, and this is to turn the child so that it will present by either the head or the breech.

It has been advised to examine the woman before labor, and if any malposition is present to correct it by palpation, but very few women will submit to be examined before confinement. But even should the examination be made and the irregularity corrected, it would be a very hard matter to keep it so. Bandages and compresses would have to be used, and a fixed position on one side. Such measures would in all probability break down the health of the woman, and the irritation caused by manipulation would tend to provoke premature labor, so that the attempt at cure might prove worse than the disease, especially as in a number of cases nature may correct the irregularity.

The best time to interfere is after labor has set in and the os has partially dilated, but before the waters have ruptured.

MANIPULATION BY PALPATING THE ABDOMEN.—The woman is put on the side on which is the head. The head is manipulated by the right hand while the left hand manipulates the breech. The child is gradually brought around until the head or breech, as may be selected, is presenting at the os, when the bag of waters is ruptured, and the head allowed to engage. If the abdominal walls are fat or swollen with dropsy so that this cannot be done, the old practice was to resort to podalic version.

Cephalic version is, however, preferable.

Some authorities teach that if the case is seen before the shoulder engages, a good rule is to bring down the nearest part.

BRAXTON HICKS' METHOD OF PERFORMING CEPHALIC VERSION.—This is sometimes called the combined or the bi-manual method. The hand with which the operator is most skillful should be introduced into the vagina with the thumb, ring, and little fingers doubled over into the palm. The other hand is placed on the abdomen over the uterus, and assists in the manipulation. The index and middle finger of the hand in the vagina are then introduced into the uterus, and with them the shoulder is shoved toward the feet, bringing the head down toward the os. The other hand assists by bringing the breech into the fundus of the uterus. In this way the child is held between one hand at the breech and two fingers at the head. The head is walked or manipulated with these two fingers until the vertex presents, when the child is held in this position until the head engages. If there is any delay in delivery, the forceps can be used.

This method is best used while the waters are intact, but it can sometimes be used after they have broken. Its performance requires a certain



amount of practice. Should the efforts made not succeed it would be proper to pass the whole hand into the uterus, working only in the intervals of pain, shoving the shoulder up while the head is brought down into position.

Hicks' method robs version of much of its danger. If the hand is introduced into the uterus there is danger of rupture, or the uterus may be torn, leading to septicæmia, or it may be bruised, causing an abscess.

Should it be necessary to introduce a hand, the other hand should be placed over the fundus to prevent danger of tearing the uterus from its attachments.

Cephalic version is the best way to treat shoulder cases. Where it cannot be accomplished podalic version must be practised.

**PODALIC VERSION OR VERSION BY THE FEET.**—This is commonly done by pulling on the knees instead of the feet. It converts the case into delivery by the breech.

Besides being useful in shoulder cases it is useful under other circumstances.

In placenta prævia, when hemorrhage threatens to cause death, the lower extremity can be brought down and used to plug the os. The child may be presenting by the brow or face, and the position of the head cannot be corrected. In such cases it may be necessary to perform podalic version. It may also be useful in inertia and occipito-posterior cases.

*Operation.*—The knee is usually close to the os, so near that it can be brought down by Braxton Hicks' method.

If the body turns so that the spine is posterior, it should be further turned until it becomes anterior. If a hand has been brought down, it should not be passed back as was formerly the case, until a fillet has been tied around it to prevent it going up over the head.

The old practice was to bring down both feet, but it is now considered better to bring down the most convenient foot, and if this one is not sufficient to effect delivery, a fillet can be tied around it while the hand goes up to bring down the other foot. One foot, however, is as a rule all that is necessary.

It may be impossible to deliver the feet by Hicks' method, and it then becomes necessary to pass in the whole hand. That with which the operator is most dexterous, is the best one to use.

The hand should be lubricated only on the outside, leaving the palm in a condition to grasp firmly. It is then introduced coned until it gets within the uterus, when it is carried to the abdominal surface of the child, and a knee or foot is felt for. The foot can be distinguished from the hand by the greater mobility of the thumb. The elbows point to the breech and the knees to the head. The knee or foot is then brought down through the os.



*Podalic version should not be practised under certain conditions.*—The child should be certainly 28 weeks old, and should be alive. If a child cannot be delivered which will live, or if it is already surely dead, it is not right to subject the woman to this operation. The child would be born afterwards as pulp, or could be delivered by crushing.

The os should be fully dilated or nearly so, as dragging a child through a constricted os might cause rupture of the uterus, or kill the child.

The bladder and rectum should always be emptied.

This operation should not be performed on a moribund woman, as it would hasten her death, and nothing would be gained for the child. It could be delivered preferably by Cæsarian section, which will give it a better chance for life.

Great care should be observed in introducing the hand, always working in the absence of pain. It should be seen that the pelvis is normal.

If Bandl's ring has become so thinned that it has become a thin band of flesh, while all above is a hardened mass, introduction of the hand would, undoubtedly, rupture the uterus, and the woman would perish. It will occur in every doctor's life that he will have desperate cases. If the child has become so tightly wedged into the pelvis by protracted efforts at delivery, so that the fingers or the hand cannot be carried far enough to manipulate the child, or if for any cause version cannot be performed, it becomes necessary to mutilate the child. Where labor is allowed to proceed for too long a time, it is possible for the child and the uterus to become decomposed. Some operators have cut off an arm. This is useless mutilation, and this raw surface is liable to cut or perforate the uterus. Decapitation has also been practised. As a rule it is only necessary to crush the head.

### **Obstetrical Operations Performed with the Hand Armed.**

**FILLET.**—This is the simplest instrument used, and is one that is always convenient. It may be a simple strip of cotton or linen cloth, or if there is enough time, it may be made as a long, very narrow sack, and stuffed with some soft material.

The objection to its use is that it is apt to work into a narrow band, when it is liable to cut. This is not so when it is folded often upon itself or stuffed.

It is used altogether as a tractor.

It is of use in many ways, but its chief field is to make traction in breech cases.

*Mode of Using.*—It is held bunched in the palm of the hand, with one end over the index finger. This finger is introduced until it reaches to the groin. The finger is then withdrawn, with a rotatory motion, and introduced again with a fold of the fillet on the tip. This procedure is



continued until enough of the fillet has been pushed up to make it come out on the other side of the thigh. This end is then brought down, leaving the fillet looped around one thigh. The loop should be examined with the finger to see that the genitalia are not caught.

Traction is then made by pulling on both ends. If the child is too far up for the finger to be used in introducing the fillet, something else, such as a catheter, can be used as a guide or director, but the finger is better where possible. It is said that the fillet can also be used as a lever to bring the occiput down in head cases.

**BLUNT HOOK.**—This is used for the same purpose as the fillet. It has the advantage of being stronger and stouter, and is easier to introduce. Recently another blade has been added to guard the point. Previous to this the index finger of the left hand was used.

The same care should be exercised not to engage the genitalia.

One handle of a Hodge forceps can be used, and answer this purpose first rate.

**VECTIS.**—Some are made double, with a blade at each end—one small and the other large. The blade is fenestrated to make it lighter and hold better.

It is used both as a lever and a tractor.

If the finger fails in making the conversion in 3d and 4th vertex, and in the after-coming head 3d and 4th pelvic, the vectis makes a more powerful lever. It can also be used to assist or make flexion of the head. When it is used as a tractor, the finger is used in lieu of another blade to make counter-pressure. It is dangerous when used this way on account of its liability to slip. When used as a lever, care must be taken not to press on the parts of the woman, as she may be severely bruised in this way.

One blade of the forceps can be used as a vectis. With a pair of Hodge's forceps, the physician not only has a first-rate instrument, but a blunt hook and vectis as well.

#### OBSTETRICAL OPERATIONS WITH INSTRUMENTS MAY BE CLASSIFIED AS FOLLOWS :

1. Operations on the child—beneficent to mother and child. Use of forceps is a good example.

2. Operations on a child already dead, or operations which will kill the child. Made for the benefit of the mother. They have in the past been frequently made, but are generally unnecessary now.

3. Operations on the mother, dangerous to both, but which have as an object saving the lives of both. Cæsarian section is a good example.

4. Operations on the mother alone, and beneficent to both. Example: Induction of premature labor.



**FORCEPS.**—The history of forceps dates back to 1640. Chamberlin's instrument, invented at that date, consisted of two solid flanges of iron, tied together with a string. Their use was kept secret for some time, and in this way the inventors, greatly to their discredit, monopolized their use. The invention consisted in making an instrument that could be taken apart, introduced, and locked again. The original instrument was like a pair of hands, and had only the cephalic curve. In time the secret was bought and given to the profession, and it was then that it began to be improved upon.

The first improvement was to make a fenestrum. By this arrangement, when the instrument is clasped to the head, it adds nothing to its thickness, as the parietal boss and ear protrude through the fenestrum, and not only does this prevent the diameter being increased, but gives a better hold.

The next change was adding the pelvic curve.

Locks were then added and improved upon.

The first lock was made by having a slot in one blade in which the other blade fitted.

This was an English invention.

The Germans then put a pivot in one blade which fitted through a slot in the other.

Hodge's lock was then added, and makes an instrument which can be made thoroughly aseptic, is very convenient of application, and holds firmly.

There was also added another curve to the blade, the concavity of which is at right angles to the cephalic curve, and looks toward the other blade.

The fenestrum is also made oval instead of kite-shaped, as it fits the parietal boss better.

Hodge's forceps in this way make no dent on the head.

When Hodge's forceps are closed the diameter of the concavity between the blades is greater nearer the handle. This fits the head, and when the forceps are pulled upon the head slips back to the smaller portion, wedging in and making the hold tighter.

*Forceps are of two styles—short and long.*—The *short* can only be used at the inferior strait; the *long* even before the superior strait is reached by the head.

The *short* forceps are oftenest required, but the *long* answers for both, and when only one pair is gotten should be selected.

*Axis traction forceps* are a modification which consists of a hook which fits on the forceps, so that traction can be more conveniently and effectually made along the axis of the parturient canal.

Sometimes when compression of the head must be made, it is difficult to continue to hold the blades of the forceps close enough together. A



string can be used for this purpose, applied around the handles, but a knife or scissors should always be at hand so that it can be immediately severed when it is no longer required.

It is very important to have a real good instrument, and only hand-forged should be used. A physician should also have one favorite instrument which he uses more frequently than others, as in that way he becomes well acquainted with it, and can use it to better advantage.

**CONDITIONS REQUIRING THE USE OF FORCEPS.**—Want of power on the part of the woman to deliver. She becomes tired and worn out, and the pains are becoming weaker. Or the head may be too large or unusually ossified, or the pelvis contracted. If the head stops at the inferior strait it may be due to a firm and rigid perineum. The physician should wait for 3, 2½, 2, 1½, or 1 hour. There can be no fixed rule, but action must be taken entirely on the merits of the case and the condition of the woman and child. When delay is too long it is destructive to the child and the mother as well. It bruises the soft parts of the woman and shuts off circulation, causing possibly sloughing with resulting fistulæ, and making the woman perhaps an invalid for the remainder of her life unless she is cured by subsequent operation.

When the forceps are properly applied they should not add anything to the pain. They do not add to the stretching of the parts, and any screaming is usually due to fright or the normal pains of delivery. After the head commences to be delivered, there is the pain dependent upon that, but this is inevitable in all deliveries without anæsthesia.

*The distance between the widest part of the blades* is 2½ inches, less than that of the child's head. This has been urged as an objection. The same measurement in most other forceps is 3¼ inches.

It is, however, a distinct advantage in the hands of the skillful practitioner, as when the head is larger or the pelvis smaller than normal, it allows of compression of the head, thus facilitating delivery. Otherwise the head would in such cases have to be crushed.

The head can generally be compressed four lines without danger, and in some cases has been compressed half an inch and a living child delivered.

Some people introduce a finger between the handles to prevent compressing too much, but this is not necessary.

**RULE.**—The forceps should be held tight enough to make the head and forceps move as one body. Otherwise the child or mother might be lacerated.

*Motion in Delivering with Forceps.*—There is a disposition in delivering with forceps to make slight motion from side to side. Delivery is thus thought to be facilitated. The motion should be very slight, never moving more than two inches on either side of the median line.



If the child's head is unusually small, these forceps can close down on it without difficulty.

**RULES FOR APPLICATION OF FORCEPS.**—The os should be completely dilated, or nearly so, and dilatable. If not, introduction of the forceps would be dangerous. The force necessary to dilate the os frequently tears it, incurring for the woman all the evils of laceration. It may also cause rupture of the cervix or uterus. The forceps should not be applied until the bag of waters has ruptured and the head is free of the membranes. Otherwise if the membranes are caught, the placenta might be peeled off, which would mean death to the child and serious uterine hemorrhage.

The forceps should never be applied without carrying one hand along with the blade as a guide. If this precaution is not taken, it might be forced through the vault of the vagina instead of into the uterus. The concavity of the forceps should be kept in relation to the convexity of the child's head. The point should never rest against the child's head, as it might go in through one of the sutures, or might amputate an ear. Introduction should never be attempted during a pain.

As a general rule forceps cannot be applied to a movable head, so the physician when possible should wait until the head becomes fixed. If the forceps are applied when the head is movable, it is liable to be grasped in an improper manner. Under such circumstances version by the breech is generally resorted to. It may happen that the woman is in convulsions, and it becomes necessary to deliver at once. If the head has not become fixed, an assistant should be directed to press down upon the fundus of the uterus. This will steady the head to a certain extent.

*Obstetricians are divided into two classes* as to the manner of applying the forceps. Some teach that the forceps should simply be applied one blade on either side of the pelvis. No successful defense can be made of this teaching. In our opinion if the head is at the inferior strait, it will be grasped properly if the child is in the usual position. As it is at this point that failure to deliver usually takes place, less injury than might be expected is done to the child by this method. But it is often required that forceps must be applied higher up. The head is then oblique, and will be grasped in such a way as may mutilate the child. The proper way of applying the forceps is to always apply them with reference to the position of the child's head. When properly applied after this teaching, the long diameter of the fenestrum should correspond to the occipito-mental diameter of the head. The forceps are applied in such a manner as to embrace this diameter, and when the head is oblique the forceps will also be oblique. When traction is made, nature rotates the head, so that when the inferior strait is reached, the blades are then on either side of the pelvis. If this method is not followed and the forceps are applied



on either side of the pelvis when the head is high up and oblique, when the inferior strait is reached the forceps may then lie obliquely in the pelvis, and will be in danger of cutting the woman. So the position of the child should be correctly diagnosed before forceps are applied. It is always good practice to examine every case for position of the child, as it is only in this way that facility in making diagnosis can be acquired, a facility that is often of the greatest importance in properly treating such cases.

When the forceps are applied high up it is not necessary to endeavor to rotate the child, but only to make traction, and nature will rotate. Traction is made by pulling a little and then releasing the grip on the forceps to let the child recover.

The amount of force to be used should only be such as can be exerted by the arms alone.

Forceps should not be applied for the convenience of the practitioner, but only to prevent suffering or to save the life of the mother or child.

**NAMING THE BLADES.**—When the forceps have a lock they are named male and female, the female blade being the one with the slot. With the English lock this does not apply, and they are named right and left, and the blade derives its name from the side of the woman on which it is placed.

**THE ADMINISTRATION OF CHLOROFORM** rests entirely on the merits of the case. If the woman is nervous and worn out it can be administered, but if she is calm and cool chloroform is not needed any more than if forceps were not to be used, as the forceps do not add to the diameter of the head. Some women become frightened at the sight of an instrument, and require chloroform to allay their fears and make them manageable.

**POSITION OF THE WOMAN.**—The woman should lie on her back. If she is on her side it is hard to keep her in a fixed position. Mechanism has been studied while she was lying on her back, so it is easier for the practitioner to keep the position of the child in the parturient canal in mind.

The hips are brought to the edge of the bed, and the feet placed in chairs. In this way plenty of room is secured to work in, and the depressions of the handles of the forceps is not interfered with by the bed.

It is also easier to make traction in this way. After a woman has been delivered by forceps once it is common for her to appeal to the physician to use them subsequently.

#### APPLICATION OF FORCEPS CONSIDERED AT THE DIFFERENT STRAITS.

**AT THE INFERIOR STRAIT.**—The forceps should be washed with soap and warm water, and then put into a warm antiseptic solution. The practitioner's hands and arms are likewise prepared. The bladder and the rectum are emptied of their contents. The blades are applied here paral-



lel to the labia. The male or left blade is introduced first. It and the back of the right hand are anointed with vaselin. It is then taken in the left hand with the handle well over the abdomen. With the right hand as a guide the blade is introduced, and depressed between the legs at the same time. If necessary, the handle can then be given to an assistant, but this is usually not necessary, as it is wedged in tight enough to hold itself.

The female or right blade is then introduced in the same manner, reversing the hands. With the finger the grasp of the blades is then explored, to be sure that nothing has been accidentally caught.

The instrument is then securely locked, and if it is properly applied the handles will be horizontal and the lock look up and down.

The handles are gradually elevated as traction is made, so that the handles finally come parallel to the symphysis.

The physician should work with the pains or simulate them, and should occasionally feel the head to see that it is in the right place and not slipping in the forceps.

Sometimes introduction of the blades causes reflex contractions. When this is the cases they are to be disregarded.

**WITH THE HEAD IN THE CAVITY OF THE PELVIS.**—This is the next most frequent position. The head is not completely rotated, and lies obliquely in the pelvis. The principles of application are the same as at the inferior strait, but the instrument has to ascend higher, and the forceps when applied, instead of being horizontal will look obliquely. *The rule is not to make but to facilitate rotation.* Traction must be made downward until the inferior strait is reached, when the handles are elevated gradually as directed in delivery at that point.

Many books will say that when the head reaches the vulva the forceps should be removed to prevent injury, and nature will complete delivery. There can be no risk if the forceps are properly handled in allowing them to remain, and removal in this way may be harmful.

The blade has to be carried away from the child's head, as the parietal boss has buttoned into it. Thus there is danger of injuring a portion of the scalp or of injuring the mother, and occasionally it happens that the mother is not able to deliver, when the forceps have to be re-applied. This makes an embarrassing situation, and is always to be deplored.

**AT THE SUPERIOR STRAIT.**—The principles for application here are essentially the same as in the cavity, except that the head is higher up, so that there is greater difficulty in applying the forceps and in withdrawing the child. As the child is in the uterus there is the additional danger from introducing a body into the uterine cavity, and the hand cannot well act as a guide.

After the forceps are applied, the handles will look obliquely up and down, and the lock obliquely sideways.



The head must rotate, but nature will do this as in other cases already considered, and the rule is the same: do not make, but facilitate rotation. If the forceps are held loosely in the hand, the head can be felt rotating.

Traction is made at first directly downward and forward. The physician should get down on his knees and pull until the head gets into the cavity of the pelvis, when the head is delivered after the manner already given.

It is somewhat difficult to make traction in such cases, so Tarnier has devised axis traction forceps. They are applied in the same manner as other forceps, and the principle lies in the addition of an attachment by which traction can be made along the axis of the pelvis. Traction is made with this until the head reaches the cavity of the pelvis, when this is removed, and delivery completed as with ordinary forceps.

There are steel hooks which can be applied and used for axis traction on almost all kinds of forceps. These can be removed from the forceps when not required.

Sometimes a strap to the knee is used so that the handles can be manipulated with the hands, and traction made with the knee.

*Elliott's Forceps.*—These have metal and hard rubber handles, which give a good grip, and can be thoroughly cleansed. There is also a screw in the handle which can be adjusted so that the handles cannot be closed beyond any desired point, the object being to prevent crushing or making too much pressure on the head of the child.

The fenestra are so arranged that the child's head cannot so well protrude, and they add to its diameter.

Elliott's cannot compress the head. There is no danger of making undue compression or crushing the head of the child with the Hodge's forceps, when they are held properly, but it can be done if desired, thus sometimes obviating craniotomy.

APPLICATION OF THE FORCEPS AT THE VULVA is the same as at the inferior strait.

SAVING THE PERINEUM.—There is usually more danger of rupture of the perineum when delivery is effected by forceps. It is saved in the manner already described, by gathering up the tissue on either side of the vulva, and making a so-called gutter. If the perineum tears, sew it up immediately after the completion of delivery. If there is prolapsus of the cord or of an extremity, especial care must be used not to embrace them with the forceps.

*In the second position vertex*, the application of the forceps is the same as in the first.

*In occiput posterior cases* application is extremely difficult, but the principle is the same.



*In face cases* the same diameters are engaged, except that the face is forward. Forceps are applied on the same principle.

*In breech cases* forceps have been applied to the pelvis, but the practice is not to be commended.

Everything needed can be done with the blunt hook or fillet without injuring the child, whereas the forceps are liable to crush the bones or injure the intestines.

It may be necessary, and it is sometimes desirable, to apply the forceps when the head is being born. This is done on the same principle as in vertex cases.

#### DANGERS OF THE FORCEPS.

*To the child.*—If properly applied the danger is slight. If the forceps grasp the face great damage may be done, and may result in death. Where the pelvis is small or the head large compression of the head may be fatal.

Sometimes the scalp is wounded. Sometimes pressure on the facial nerve causes paralysis, but this usually passes off in a few days. Pressure may cause inflammation, but the indentations from the forceps usually pass off in a few days without injury.

*To the mother.*—There should be no danger if properly applied and manipulated.

It has been said that in making a quick delivery that the placenta has been peeled off, causing delayed contraction and retraction, but it has been observed that this objection is not material.

The forceps may injure by pulling the child through a tight place. The necessity for doing this is a question which the physician must decide. It often causes less injury than would result from other efforts at delivery.

A frequent cause of recto and vesico-vaginal fistulæ is not applying forceps soon enough, allowing too long compression of the parts, and causing sloughing.

Tearing of the perineum and vulva are due more to a lack of skill.

In our opinion, it can be said with truth that the forceps have saved more lives than any other instrument.

#### **Operations for Effecting a Delivery where the Head is too Large or the Pelvis too Small for the Child to be Delivered by the Simple Application of Force.**

**COMPRESSION OF THE HEAD.**—This can be done with the forceps. It is generally considered that the head can be compressed four lines and effect delivery of a living child. Compression can be carried to six lines with a hope for life, and some authorities say more.

If the patient has an antero-posterior diameter of the pelvis of  $3\frac{1}{4}$  inches, the physician can hope to deliver by making compression with the for-



ceps. Hodge has delivered when the diameter was only three inches, but this can hardly be given as a rule.

If a woman with such a contracted pelvis is seen before labor induction of premature labor should be advised, if there is sufficient time before delivery. But if it is too late, or labor has already set in, Cæsarian section should be first advised. This, however, is not always practicable, if, for instance, the head has engaged. Or the child may be dead, when it would be improper to subject the woman to this operation.

**SYMPHYSIOTOMY.**—This operation consists in dividing the symphysis and displaying the parts. The gain in diameter is, in the opinion of the writer, out of proportion to the risk of the operation, and it is not to be advised.

There are two other operations open to choice.

#### CRANIOTOMY AND EMBRYOTOMY.

*Craniotomy* consists in perforating the head and emptying it of its contents, when it will contract so as to be easily delivered.

*Embryotomy* is the name given to the operation where it is necessary to mutilate the child—removing it by piecemeal. It is an operation of the most ancient character, and in recent years has passed into disuse. Most cases can be delivered safely by premature labor, thus avoiding the necessity of both of these operations.

There are some cases where this operation is not sufficient, and *cephalotripsy* must be resorted to. This consists in crushing the head into a soft mass by means of a cephalotribe.

There are still other cases where even this is not sufficient. When the pelvis only measures  $2\frac{1}{4}$  inches, the danger of delivery per vaginam is so great that Cæsarian section is to be unconditionally recommended.

**RULE.**—When the pelvis is contracted to  $3\frac{1}{4}$  inches, delivery should be effected if possible by compression with forceps. If the pelvis is between  $3\frac{1}{4}$  and  $2\frac{1}{4}$  inches, premature labor should be induced if there is sufficient time before delivery, if not Cæsarian section should be advised. If consent cannot be gotten for this, craniotomy, embryotomy, or cephalotripsy should be performed.

If the diameter is less than  $2\frac{1}{4}$  inches, Cæsarian section is the only resource left.

**CEPHALOTRIPSY.**—The head is crushed in different directions with the cephalotribe until it is reduced to a pulpy mass. Hodge says that the spiculæ of bone never cut through the scalp. Its use is rarely to be recommended. It is very dangerous to the mother; kills the child, and the head has still to be delivered after it is crushed. Winckel has delivered 15,000 cases, and has never used it.

**CRANIOTOMY** accomplishes everything with less danger to the mother. It is an operation that can never pass into oblivion, and will always, in



some cases, be necessary. It consists in perforating the head, washing out the contents, and afterward crushing the head if necessary.

The bladder and rectum should both be emptied, and the patient anæsthetized. It is advised that the perforator should enter at a suture or fontanelle, but through a well-marked bone does better, and there is no danger of slipping if the instrument is a good one.

The head may be perforated with a trephine. This is not generally used.

There are a pair of scissors for the purpose with blades opening outward, but which require two hands to operate. There is another kind which require only one hand (Nægele's). This makes a perfect perforator. There is a bar running between the handles to hold the blades together. It is introduced with the blades closed, using one hand as a guide. The point is forced through the skull, the bar at the handles broken, and the blades separated. This is repeated until the skull is well perforated, when it is projected into the brain and that well broken up. The contents of the skull are then washed out with a syringe and aseptic fluid. The skull then usually collapses, and the mother may deliver the child herself. If not, a tractor made for the purpose, is used, having one blade on the outside and one on the inside of the skull. It may even then be necessary to cut the skull up with scissors, removing the pieces with forceps.

The crotchet is an instrument used to make traction by inserting it into the foramen magnum or sphenoidal fissure.

Craniotomy has been done successfully with a pocket knife and a small stick tied on a piece of string, when nothing else could be gotten. The head is perforated with the pocket knife, and the stick inserted through the aperture and turned crosswise, when traction is made on the string.

SYMPHISIOTOMY dates back to 1773, when it was introduced by Sigault. It is said to do good, not only by increasing the diameter of the pelvis, but also by making an opening through which the head can pass.

When first introduced it was received very favorably, but afterwards fell into disuse, and has only been revived in the last five or ten years. The operation is, in the opinion of the writer, to be condemned. It is improper because, should the ends of the bones be separated one inch, there is a gain of only five lines in the antero-posterior diameter. It has been found that even this amount of separation is sometimes dangerous, 2 or 3 inches is always so, and often it is necessary in addition to deliver the child with forceps or by craniotomy, as it is impossible to accurately determine the size of the child. The bones have been splayed open as much as  $1\frac{1}{2}$  and  $2\frac{1}{2}$  and 3 inches. Two inches gives a gain of only three lines over one inch, making the total gain eight lines. Anything over one inch subjects the woman to danger. Women on whom this operation



has been performed, have sustained serious injury to the bladder and the rectum, and the operation has also been followed by fatal inflammations, or have left fistulæ, etc.

Very often the joint has failed to regain its vigor of union, so that locomotion has been interfered with or prohibited.

This operation does very little more than can be done with Hodge's forceps.

The statistics are a mortality of mothers,  $33\frac{1}{3}\%$ ; of children,  $40\%$ .

*Method of performing.*—The parts are shaved and sterilized. The ligaments of the joint are then divided with a knife.

This operation has been modified by sawing through the rami of the pubes instead of dividing at the joint. This gives more room, but is much more dangerous to the mother.

**CÆSARIAN SECTION.**—The record of this operation is very old, dating back to 1000 B. C. It was originally suggested in order that a living child might be delivered from a dead mother.

This operation is now known as post mortem Cæsarian Section. It had been found that where women had died suddenly, as from apoplexy, injury, etc., that by cutting down through the abdomen and uterus the child could occasionally be taken out alive. Cæsar is said to have been delivered this way (?). Obstetricians and surgeons believe that the child has lived 25 minutes after the death of the mother. But if 25 minutes has elapsed it is useless to perform the operation.

Although it must be done with a certain amount of haste, it should be performed in proper method, so that if, per chance, the mother should not be dead she will not be unnecessarily injured.

The operation is more common in recent years. Formerly the mortality was so great,  $75\%$  dying, and so many of the children, that it was only performed as a last resort. Since aseptic surgery has been introduced the mortality has been reduced to  $8.2\%$  of the mothers, and  $80\%$  of the children have been taken out alive. These statistics are from the best hospitals, and if statistics from private houses were included the mortality would doubtless be greater.

The maternal mortality when craniotomy has been performed is only 2 to  $3\%$ , and where no attempt has been made at delivery with forceps it approaches zero. When these two operations are weighed, one against the other, it is suggested that the woman should take the additional risk in order to save the child. This is explained to the woman and relatives, and they are left to decide.

In certain cases there is no choice of operation, as when the pelvis measures  $2\frac{1}{4}$  inches or less, or where there is a tumefaction in the canal, or cicatrices which will prevent parturition, or where the uterus has passed through a hernia and become pregnant in that position.



*Operation.*—The preparation is the same as in other laparotomies. If there is opportunity for doing so, the time for operation should be selected, the best being when labor has commenced, the os partially dilated, but the bag of waters not broken. Incision is made along the median line even if the patient has been operated on here before. Cutting down the glistening uterus is reached. Assistants then hold the walls of the abdomen down on the uterus until all bleeding is stopped by ligatures, etc., to prevent the fluids escaping into the peritoneal cavity. The uterus is then turned out of the wound, and partial sutures inserted. An elastic ligature is then passed around the neck of the uterus lightly, and is not tightened until the child is about to be extracted.

The uterus is incised along the median line. If possible, cutting down over the site of the placenta should be avoided. The site can be determined to a certain extent by palpation during the intervals between pains. It has been advised to puncture the uterus with a trochar in order to ascertain, but this is a dangerous procedure, and not advised, as it makes a hole which may enlarge and result in septic infection. Having determined as well as possible the location of the placenta in order to avoid it, the incision is made of sufficient size to permit of extraction of the head and breech. If the incision is insufficient it can be enlarged with a curved probe pointed bistoury. It has been advised to cut through the placenta if the incision is over its centre, but this should not be done unless it is found impossible to peel it off on one side. An assistant then puts one finger in either end of the cut, so that when the bag of waters ruptures the uterus cannot contract and prevent removal of the child. In removing, the breech is preferably selected first. Do not sever the cord until the child has breathed freely. If it does not breathe, an attempt should be made at resuscitation. A new and very good method has recently been suggested by Dr. Dew.

The asphyxiated child is taken into the hands, and the child is bent up with its feet over its head. This expels the air, and bringing back causes an inspiration. It has the advantage that it can be practised with the child in a basin of warm water, which assists materially in resuscitation. After the child breathes freely, the cord is tied in the usual way and severed, and the child is handed to an assistant. The ligature around the neck of the uterus is then tightened. This is not done before unless necessity forces it, as it shuts off circulation from the child. The placenta is then peeled off, and it, with the membranes, removed. The uterus is washed with a 5% carbolic solution, and dusted with iodoform. It is then sewed up. This is best done by Säger's method, which consists in sewing first the mucous layer, then the muscular, then the peritoneal.

Sutures of the abdominal wall are made in the same manner. After treatment is the same as in other laparotomies.



Porro suggested that as the uterus is liable to be a source of infection, it should always be removed with the tubes and ovaries. He reduced the mortality to fifty per cent. It is now found that since Sanger's operation has been practised that Porro's is not necessary, except where some abnormality of the uterus would require its removal; as where it is wrong congenitally; where it contains a tumor which endangers life; where the woman has osteo-malacia, which is aggravated by each pregnancy; where the uterus is cancerous, or where it is infected and putrid. Unless some of these indications are present, the uterus should not be removed.

Where the uterus is removed, the stump is sometimes treated by being brought into the wound and treated externally, but it is better to stitch up the stump after Sanger's method and drop it.



## CHAPTER XII.

### INDUCTION OF PREMATURE LABOR.

This is comparatively a recent operation. It had been performed as far back as 1756, but not with any frequency until 1831, when it was endorsed by the French academy. No obstetrical operation has done so much to save life. It is performed sometimes for the benefit of the mother, but more frequently for the child. With the mother only three per cent. die, while one-third of the children survive.

CONDITIONS REQUIRING PREMATURE DELIVERY.—These rest sometimes with the mother; sometimes with the child.

CONTRACTION OF THE PELVIS is the most frequent cause. As has been already stated the forceps can sometimes compress the head of the child half an inch without death of the child; one-quarter, and by some authorities one-third, without any danger. If this amount of compression is sufficient to deliver at term, induction of premature labor should not be practised. But if this amount of compression is not sufficient, choice lies between premature delivery, craniotomy, and Cæsarian section.

If contraction is only moderate, premature delivery should be advised, if there is sufficient time before term.

MEASUREMENTS OF THE CHILD'S HEAD AT DIFFERENT PERIODS.—These measurements are averaged from those given by Tarnier and other men of eminence.

At 9 months . . . . .	3.54 to 3.74 inches.
“ 8½ “ . . . . .	3.35 “
“ 8 “ . . . . .	3.15 “
“ 7½ “ . . . . .	2.96 “
“ 7 “ . . . . .	2.76 “

No measurements are given for under seven months, as a child born at that time could not live, except in very unusual cases. After the child reaches seven months, its chances for life increase as it approaches term. This table is necessarily only approximate, as children differ in size with different women. The prudent physician will not make a dogmatic assertion or prognosis.

CARE OF CHILD BORN BEFORE SEVEN MONTHS.—If a child is born between six and seven months, an effort should be made to cause it to live. Incubators for taking care of such children have been devised. A



very good and cheap one, though not the best, is one which simulates a double-lined bath tub, and has hot water running between the double lining, and is lined on the inside with carded wool.

A reasonably good incubator can be extemporized by using a tub-shaped basket, and lining it with a soft sheepskin and filling it with carded wool. This makes a very thorough protection for the child.

*If a woman's pelvis measures less than 2.76 inches* it is useless to advise premature delivery, as the pressure necessarily made on the head of a viable child sufficient to deliver it would result in its death. In such women either abortion must be induced, or she can be allowed to go to term, and have performed upon her Cæsarian section.

*Definition of premature labor and abortion.*—Books differ as to the meaning of these two terms. Abortion should be confined to those cases where the child is delivered before its viability, or before seven months; premature labor to those cases where the child is delivered after viability, or after seven months.

OTHER CONDITIONS REQUIRING PREMATURE DELIVERY.—Contraction of the parturient canal from cicatrices resulting from previous tears.

Cancerous tissues and tumefactions.

Certain diseased conditions of the woman.

Puerperal convulsions. The woman may become so persistently uræmic, either with dropsy or with toxic symptoms, as to require this operation, although she may not have convulsions.

Chorea, epilepsy, tuberculosis, pneumonia, pernicious anæmia, etc., have been given as at times sufficient causes for inducing premature labor, but it has been found that it does not improve these conditions.

*Extraordinary development of the child.*—Some women have children so well developed and so large that their delivery at term in a natural way is impossible, even if the pelvis is normal.

In other children the bones are so well developed, and the head so hard, as to make delivery difficult.

Other women carry their children over term. This always causes trouble, as the child continues to grow as long as it is in the uterus. Cases have occurred not infrequently where the child has been carried one month beyond term.

Experience will usually dictate when premature delivery is indicated in such cases.

*A warning.*—The mother will often say that the child is dead and want to be delivered. The mother should never be considered as a judge of the viability of the child. But even if the child is dead, this is not of itself a justifiable cause for inducing premature labor, although the pregnancy may be multiple, and one child is alive. The child does not putrefy and the woman is not poisoned, and nature will herself shortly bring on delivery.



The child is born all the more easily when the head is macerated and soft.

Besides, there is no absolute rule for being sure that the child is dead, as absence of the foetal heart beat may be due to position of the child and other causes. But if the bag of waters ruptures, and the child is dead, labor must be induced if it does not take place.

**Methods of Inducing Premature Labor.**—Operate only on consultation. Everything is conducted as in a natural labor, except that chloroform should not be used, as the woman should be wide awake, so that she can render all assistance possible by bearing down, etc., and so preventing unnecessary use of the forceps.

**IRRITATION OF THE BREASTS.**—It has been thought that this would induce labor, but it is not so.

**RESIDENCE IN HOT CLIMATE** has been thought a cause, but this is not so.

**DRUGS.**—Various drugs have been used for this purpose, notably ergot; but although ergot is a most powerful drug for stimulating uterine contractions after they have commenced, it is doubtful if it can initiate them.

Quinine has been thought capable of initiating uterine contractions, and it may do it unless the woman has a clear history of malaria.

Aloes have also been used, *but no drugs can be relied upon.*

**PUNCTURE OF THE BAG OF WATERS.**—This is a sure method, but it is not a good one, as it entails serious disadvantages to both mother and child.

The simplest and easiest method of doing it is to open the bag at the presenting point. This subjects the child to very great pressure.

Puncture higher up with the bougie or catheter preserves the waters for a longer time, but it still subjects the child to such great pressure as to often be fatal. The child, too, is often born with a caul. It is dangerous to the mother from its tedious character.

This method has been practically abandoned, as the results are not satisfactory.

**VAGINAL DOUCHES.**—By this method water is allowed to flow into the vagina, using either a bulb or fountain syringe. The quantity is generally several pints, and it is either hot or cold, or alternating one with the other. This method is very uncertain, and when cold water is used it is liable to produce inflammation, and in rare cases the stream has bored a hole through the vaginal vault.

**TAMPONING THE VAGINA.**—This acts by irritation of the vagina, and distention from the large mass in it. The pressure interferes with the bladder and rectum, and is liable to cause injury. It is not at all sure.

There is a French instrument, the *colpeurynter*, which has a bulb on the end of a tube. This can be inflated, and acts in the same manner as the tampon. There are the same objections to its use.



ELECTRICITY is very uncertain, and is very liable to destroy the life of the child. Its use has been abandoned.

CARBONIC ACID GAS.—This is generated in a retort, and directed toward the mouth of the uterus with a pipe. It is very uncertain, and enough is absorbed by the mother to poison her; sometimes fatally.

DILATATION OF THE OS AND CERVIX UTERI.—This is a very good method, and is certain.

It can be done in several ways.

When speedy dilatation is necessary the steel dilator is the quickest and best. Dilatation must be performed with great deliberation, as it is liable to rupture the cervix. If proper care is used, the cervix can, in the great mass of cases, be dilated without tearing.

Dilatation should be commenced with a very small instrument, then continued with a larger, and then the largest size. After being carried to a certain extent, it can be completed with the fingers, introducing one, two, and three, or Barnes' rubber dilator can be used. This is a fiddle-shaped rubber bag, fitting on a tube. It is dilated by injecting air or water. In such cases it should always be injected with some antiseptic or sterilized fluid. If air is used, and any should escape, it might pass into the vessels of the uterus with perhaps fatal results. The fluid should be aseptic, so that it can do no harm should it escape. Before using, it should be injected to ascertain its capacity, as otherwise it might be ruptured.

Instead of metal dilators, tents are often used. These may be of sponge, laminaria, or tupelo wood. The laminaria is to be preferred, as it is smooth, although somewhat slow. The sponge tents are apt to lacerate with their sharp points. Using a tent more than once, however sterilized, would be criminal.

More recently this dilatation has been effectually and safely accomplished by packing the os and cervix firmly with iodoform gauze. This is removed from time to time, and the opening is again packed until sufficient dilatation is procured.

There are cases where it is proper to use both gauze and metal dilators. This is best for abortions.

INTRODUCTION OF AN OBJECT BETWEEN THE UTERINE WALL AND THE BAG OF WATERS.—This is the best method for inducing premature labor. A catheter was used in early days, and is a good enough instrument if perfectly sterilized. A solid bougie, No. 8, 9, or 10 French, is, however, better, and the surface can be thoroughly cleansed. The shoulder at the end of the bougie should be cut off.

No chloroform is necessary.

The physician passes two fingers into the vagina, then introduces one finger through the os, and moves it around the inner surface of the uterus. If the finger cannot be introduced through the os, it should be dilated. The bougie anointed with aseptic vaselin is then passed in between the



membranes and the uterus, and is coiled around the os in as large a circle as possible. There is no need for introducing to the fundus. There is no risk of rupturing the bag of waters, as the field has been explored by the finger.

The tampon is sometimes advised afterward, but is not necessary.

The bougie introduced at 4 or 5 in the afternoon will usually cause delivery of the child at about 11 or 12 in the forenoon of the next day. This method very seldom fails, and produces a labor that is perfectly natural, except that it is longer. If the first attempt fails, a second can be made.

GLYCERIN HAS BEEN INJECTED after the following method:

A catheter is well disinfected and passed between the membranes and the uterus. Two ounces of glycerine that has been boiled two hours is then injected through this very gently with a syringe.

When the glycerine is prepared there should be enough in addition to fill the syringe and catheter to prevent any risk of introducing air, which would be very dangerous. There is danger of rupturing the bag of waters or from breaking the placenta loose from its attachments. Results have not been good when using this method.

After labor has been induced the mechanism is the same as in natural cases.

**Induction of Abortion, *i. e.*, prior to viability of child.**

*Indications.*—Nausea and vomiting where all other means have failed. Other indications are exaggerations of those for induction of premature labor.

The METHODS are very similar to those used for premature delivery, except that not so much care is taken for the child and the means are used more boldly.

PUNCTURE OF THE MEMBRANES is not so objectionable, and is frequently practised. The cervix should be dilated before this is done. Metal dilators are used. Nothing more than necessary is attempted.

INSTRUMENTS USED.—Abortion forceps are similar to regular forceps, except smaller. The instrument is introduced as a probe, and is then brought around to act as a forceps.

Another instrument after the same order is the one devised by Professor Schultz.

The volsellum is used to hold the uterus down.

Another style of abortion forceps can be used for the earlier months. The finger is introduced and the object located, when the forceps are introduced on the finger and the object grasped.

Mundy's blunt curette is very useful in such cases. So, too, it is a good plan after operating to loosely fill the cavity of uterus with a small strip of iodoform or sterilized gauze after Polk's method.



## CHAPTER XIII.

### PELVIMETRY.

When a case of confinement is undertaken, the history of former pregnancies and the family history should be inquired into, to see if there has been any difficulty in delivery.

The parturient canal should also be examined if there is any suspicion of trouble, in order to know what size body can pass through.

The pelvis should also be measured in the manner to be described.

INSTRUMENTS.—The pelvimeter, made after the style of a pair of calipers, with a dial to show the measurement, is the best instrument. It can be used inside and out.

THE MEASUREMENTS OF THE NORMAL PELVIS are as follows:

Distance between anterior superior spines . . . . .	10	inches.
“ “ most prominent points of crest . . . . .	11	“
“ “ great trochanters . . . . .	12.5	“
“ “ spine of last lumbar vetebra and symphisis . . . . .	7.9	“
Circumference of false pelvis . . . . .	35.5	“

Each side should be measured separately to ascertain if they are symmetrical.

The distance from the lower margin of the pubic joint to the promontory of the sacrum is called the diagonal conjugate, and the true conjugate is obtained by subtracting  $\frac{5}{16}$  to  $\frac{6}{16}$  inch from this. The measurement is taken by introducing two fingers into the vagina and pressing back until the promontory of the sacrum is reached, when a finger of the other hand is placed on its fellow close up to the pubic arch, when the hand is withdrawn and the distance measured.

The mid and inferior straits can be measured with the pelvimeter, but most practitioners use two fingers, and holding the distance measure it outside.

With these measurements there should be no trouble in getting at the correct size of the canal and knowing when it would be best to effect delivery.



## CHAPTER XIV.

### ABORTION.

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CAUSES.—Abortion may be produced by a great variety of causes.

The woman herself is first to be considered, as there is a great difference in the way that different women are affected. Women have been gored by bulls, fallen down stairs, or jumped from bridges, and have been operated on for ovariectomy, and recovered from these injuries, and still accomplished a safe delivery at term; while in others the merest trifles, such as mental emotion, over-exertion from walking, or from standing too long, or the jar from a misstep from the curbing to the gutter have been a sufficient cause. It is said that the sex of the child has some influence, and that girls are more frequently aborted than boys; and also that it happens more frequently when there is a great difference in the age of the parents.

A family history of abortion creates a strong predisposition. There is no question about the habit being acquired, and after a woman has aborted once she is much more liable to do so again. Such cases, however, should not be given up, even when the habit has been very strongly formed, as women have been brought successfully to term after many abortions.

Women who menstruate profusely are more liable to abort, especially those with whom the period is delayed. High altitude has some influence. Tight lacing, by interfering with the flow of blood and causing congestion of the parts, may produce it. Eruptive fevers, certain diseases and cachectic conditions, as syphilis; inflammation about the organs, as endometritis; affections of the placenta, displacement of the uterus, excitement from dancing, riding on a train, frequent coitus, etc., have all been sufficient to cause abortion. Syphilis is a very frequent cause.

SYMPTOMS.—These are at first very obscure. Nevertheless, there is more or less nausea and vomiting; the extremities become cold; the pulse depressed, and pain forms a prominent symptom. Frequently a diagnosis can be made from the situation of the pain. These pains simulate those of labor, and are followed by a discharge which is at first grumous and afterward bloody. A woman may have all of these symptoms, but if examination of the uterus finds the os normal, recovery may be hoped for. Recovery, without the loss of pregnancy, may take place after the os is slightly dilated, but in such cases the prognosis is not so good. When, however, some of the waters have escaped, or some of the membranes been expelled, such recovery is impossible, and a safe delivery must be hastened.



In another class of cases, abortion is caused by death of the fœtus in utero. Delivery then is only a question of time, and usually takes place in about nine days.

It may happen in an abortion that the fœtus will be expelled, but the placenta, or some of the membranes, remain. These may come away afterward, or may set up septic inflammation, cause hemorrhage, or be the source of new growths, cancer, polypi, etc. Some text-books are deceptive as to the treatment of such cases. *There is but one treatment, and when an abortion occurs, the practitioner must then and there complete it, and leave nothing behind.*

**TREATMENT.**—If abortion is inevitable, and pregnancy has advanced to four and a half months, the treatment is comparatively simple. The placenta has formed; a genuine labor occurs, and the uterus is large enough to permit the finger to be introduced so that the uterus can be thoroughly cleaned.

But if it occurs in the third or fourth month, which is the most usual time, the placenta has not been formed, and the membranes are closely adherent to the uterus, so that they cannot be easily gotten hold of. In such cases the curette must be used. The blunt is preferable, because it is less dangerous, but the sharp curette is also used.

Sometimes when the membranes are allowed to remain, they decompose, and cause the uterus to become so rotten that when even the blunt curette is used it may puncture the uterus. This is another reason why the operation should be performed at the time of the abortion.

An excellent method of treatment, used by Dr. Polk, of New York, is to irrigate the vagina and uterus with antiseptic solutions; dilate the os; break up the contents of the uterus with the curette, and remove; then irrigate, and pack the uterus lightly with iodoform gauze. This packing is removed daily and renewed as often as is necessary to completely absorb and drain off all discharges and until the gauze comes away clean. Usually about three packings are sufficient.

Another method of treatment is to tampon the uterus, and the blood collecting behind will insinuate itself between the membranes and the uterus, and so cause them to separate. After twelve hours, the tampon is removed, and the entire contents of the uterus will usually come away with it.

*The tampon must never be used after the placenta has formed, as it is liable to cause occult hemorrhage.*

When abortion has not gone so far but that recovery can be hoped for, treatment should be directed to keeping the woman as quiet as possible. She should be put to bed; her bowels should be relieved in some gentle manner; opiates should be given, either morphine or an enema containing McMunn's elixir. For medicine—teaspoonful doses of fluid extract of



Black Haw should be given every six hours. This is a very superior medicine, and controls uterine contractions.

At every menstrual period after this, she should be confined to bed to prevent any tendency to abort.

Any discharge should be kept for the doctor's inspection, and he should examine it under water, so as to detect any membranes, etc., that might have been passed.

When it is impossible to ascertain whether abortion is complete or incomplete, or whether it has not gone too far for recovery, a tentative form of treatment should be adopted.

Long continuous bleeding requires the parts to be explored, and the retained parts gotten out. Perimetritis is no contra-indication for this.

If the discharges are unnatural, Polk's method should be adopted—putting a strip of iodoform gauze into the uterus, and removing daily. This is in no sense a tampon.



## CHAPTER XV.

### RUPTURE OF UTERUS, CERVIX, VAGINA, AND PERINEUM.

#### Rupture of the Uterus.

This was formerly given as occurring once in 2,000 cases; more recent books give one in 4,000.

This accident is very fatal to both mother and child, 90% to 95% of the women dying, and an even larger percentage of the children.

CAUSES.—Some obstruction to delivery of the child.

Severe contractions caused by ergot.

Some previous injury.

Diseases causing softened spots in the uterus.

Tumors.

Cicatrix from a former Cæsarian section.

Abnormal tuberosities, as enlarged ilio-pectineal eminence, which rub against the uterus.

Rubbing of the uterus on a contracted pelvis.

Hydrocephalus and spina bifida in the children.

Passing the hands or instruments into the uterus, especially the forceps, and during contractions.

SYMPTOMS.—These are sometimes not marked, when the rupture is small, but in from half to one hour they become very marked, and usually set in at once. The woman will be in a very severe labor which will suddenly cease, or become of a dull character. If the hand is on the abdomen, the tearing may be felt.

There is great alarm and shock on the part of the patient, who becomes exsanguinated; the pulse rapidly fails, and a cold, clammy sweat appears.

The presenting part recedes, and contractions of the uterus cease.

If the child has entirely escaped into the peritoneal cavity, two masses can be palpated in the abdomen; if the escape has been only partial, there will be one irregular mass.

The hand introduced into the uterus can feel the rent, and sometimes coils of intestine in the uterus.

A continuous hemorrhage is usually seen, but this may take place internally.

If the child does not escape, these symptoms are not so marked.



The rupture usually takes place in the lower segment of the uterus. When this segment becomes very thin, the danger line is being approached.

**PROGNOSIS.**—Almost certain death. This results most frequently from hemorrhage; next from inflammation and septicæmia. Peritonitis is a common sequence.

**TREATMENT.**—When rupture is threatened by thinning of the lower segment of the uterus, delivery must be accomplished at once either by forceps, Cæsarian section, or embryotomy.

When rupture has taken place, delivery should be hastened, if practicable, by forceps or version.

If the child has partly escaped, it should be brought back through the rent and delivered, and to accomplish this it would be permissible in such cases to enlarge the rent.

If the child is in the cavity of the abdomen and the uterus has contracted, abdominal section is the only resource left. After this operation, in such cases it would be permissible to sprinkle the cavity of the uterus with iodoform.

The operator puts his hand into the uterus three times if the case is treated without abdominal section.

1st. To go up after the child.

2d. To go after the placenta and membranes.

3d. To clear away intestines from the rent.

The uterus should then be allowed to contract down on the hand and drive it out.

4th. The uterus is then syringed out with an antiseptic fluid, and a loop of drainage tube passed up through the rent into the abdominal cavity.

The woman is treated for collapse when occasion requires.

A binder and pads should be applied to the abdomen snugly in such a manner as to hold the lips of the rent together.

If the physician decides that there is too much blood or fluid or other matter in the peritoneal cavity, abdominal section must be practised. In cases where abdominal section is used, the uterus is sutured with deep and superficial sutures, and the abdomen treated as is usual in such operations.

### **Rupture of the Cervix.**

Mere rents of the external os are not of much importance, but as the tear extends up the cervix it increases in importance. If a tear involving an appreciable amount of the cervix is allowed to go unrepaired it may prevent the woman from bringing future children to term, and may make her for the time being an invalid. The proper treatment is to bring down the cervix with a volsellum at once, and sew up the laceration.

If the tear involves a vessel of the ostium and causes slow bleeding, it can be stopped by applying a pledget of cotton soaked in Monsel's solu-



tion. This is in no sense a tampon to the uterus. A hot solution of alum, fifteen grains to the ounce, is also good and preferable to Monsel's solution.

### **Rupture of the Vagina.**

This may take place in either the lower, middle, or upper third. Those taking place in the lower and middle thirds are comparatively innocent, but those of the upper third are second only to the uterus in importance, as sometimes not only are all of the coats of the vagina involved, but also the peritoneum.

**CAUSES.**—Same as those of uterus.

**TREATMENT.**—The same general principles as in rupture of the uterus must be observed, but it is not usually so imperative to open the abdomen.

If the peritoneum is very much soiled or injured the cavity must be opened and the toilette completed as already directed. If this is not necessary, a drainage tube is passed through the rent for the distance of one inch, and then an antiseptic pad is applied to the vagina. Renewals of the pad and further dressings are to be governed by indications.

### **Rupture of the Perineum.**

**CAUSES.**—This occurs often when the patient is a primipara; when the head or other parts are unusually large; when the parts are unyielding; very often when the mother is pregnant for the first time late in life; often from the use of instruments.

**TREATMENT.**—The perineum should be sewed up at once with deep sutures that take in the muscles of the perineum, especially the levator ani. Unless these are included only a skin flap is secured which accomplishes little or nothing. The knees should be tied together to prevent tension. The stitches should be removed in from seven to nine days. The woman thus recovers from the operation by the time she would sit up under ordinary conditions. If the operation is not done at once it necessitates another operation at some future time with confinement in bed, and not so good a chance of success, and possible uterine displacement.

Sepsis is also greatly prevented by closing a wound that would act as a large absorbing surface.



## CHAPTER XVI.

### OTHER CONDITIONS AND ACCIDENTS CONCERNED IN DELIVERY.

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**Rigid and Unyielding Os Uteri.**—This condition is due to some disease of the woman, or cicatrices from old tears, etc.

It can often be corrected if seen before labor, but if the patient is seen for the first time after labor has commenced, rapid measures must be employed.

Many books recommend that the os be smeared with belladonna ointment, but this does not seem to have much effect.

The patient should be catheterized and given an enema, and then anæsthetized to unconsciousness with chloroform. If the rigidity does not yield to this, chloroform may be pushed to the stage of perfect anæsthesia. If this is not successful, chloral may be given in twenty-grain doses every three or four hours by *enema*, and in addition morphine and atropine may be given hypodermically.

If the rigidity still does not yield, the cervix should be dilated with Barnes' bag. If one of these cannot be obtained, dilatation may be done cautiously with the fingers, or the cervix may be packed with iodoform or aseptic gauze.

If all these means fail, the os uteri should be nicked in several places with a curved bistoury.

The risk of these extending and causing rupture of the cervix is very small, but as there is some risk, this operation should not be employed except as a last resort.

**Episiotomy.**—Exactly the same condition as above is sometimes found also at the ostium of the vagina. In order for the child to be born something must give way, and the tear usually extends through the perineum, sometimes involving the rectum. This is the most unfavorable direction in which the tear can take place, and if this accident is threatened the vulvar orifice should be nicked on either side. This causes the tear to take place in that direction, and prevents rupture of the perineum.

After-treatment is not difficult.

**Agglutination of Os and Cervix Uteri.**—This is a very rare but interesting condition which prevents the muscular fibres of the uterus from opening the cervix. It may occur from inflammation of the endometrium, or from various ulcerative processes; and in order for it to occur in obstetrics, must take place after the woman has become pregnant.



In nearly all cases a dimple can be found which indicates the situation of the os. This point should be pressed upon to see if it will give way, and if so a way may be made by the finger. Or a speculum can be introduced, the point caught up on a tenaculum, and an incision made with a bistoury.

It sometimes happens that the cavity of the cervix is entirely obliterated. This condition is very rare. Treatment would consist in making an opening through the cervix.

**Inversion of the Uterus.**—This occurs once in 17,000 labors.

**CAUSES.**—The most common cause is from pulling on the cord in delivering the placenta, one-fourth of the cases resulting from this. Therefore great care should be used in delivering the placenta, which should be accomplished by compressing the uterus with one hand on the abdomen, the other hand grasping the cord, and making only sufficient traction to guide the placenta out. In order for the inversion to be produced in this manner, the placenta must be wholly or in part attached to the uterus. This is seldom the case at the completion of the second stage, as it then usually lies either entirely in the vagina or half way out of the os.

The next most frequent cause is from paralysis or thinning of one portion of the uterus, usually the placental site. This then sags down, and is grasped by the other fibres, and may be brought down by their normal contractions.

Unscientific kneading of the abdomen, by pressing on the fundus in one spot, may also produce this condition.

**SYMPTOMS.**—It generally occurs immediately after labor, and is attended by great pain, hæmorrhage, and the most profound shock. The shock occurs whether the inversion be complete or partial, or whether the loss of blood be great or little, and is due to sympathetic action on the nervous system. The woman becomes pallid, more or less blind, pulseless, and her extremities become cold. Occasionally there is profuse hæmorrhage.

**PROGNOSIS.**—If death results, it usually occurs at once.

Recent statistics show that where proper treatment is used about one-fourth die. When she lives for some time, death may be caused by subsequent inflammation or septicæmia.

**DIAGNOSIS.**—The only conditions likely to be confounded with this are polypus and sub-mucous fibroid of the uterus. It has happened that surgeons have operated for both of these, when the true condition was inversion of the uterus.

In inversion the error should not be made.

A tumor is suddenly developed in the vagina, and after emptying the rectum and the bladder; by passing two fingers into the rectum and a catheter in the bladder, the absence of the uterus in the abdomen can be made out.



A probe inserted through the vagina cannot find an opening into the uterus as would be the case in polypus and fibroid. If the woman is not too fat, the depression at the point where the uterus should be can be detected by bi-manual palpation.

VARIETIES OF INVERSION are complete and incomplete. When complete the uterus can be pulled down with a volsellum, and the ring at the junction with the vagina made to disappear. The uterus will be dark purple in color, which contrasts with the bright color of the vagina. In old cases the inner surface of the uterus has been found to become hard and assume the character of skin.

TREATMENT.—It is claimed that the uterus has been replaced by nature, but the chances for this are very small, so the physician should proceed to replace at once.

It sometimes happens that the placenta remains attached. It has been advised in such cases to allow the placenta to remain until the uterus is replaced, in order to prevent bruising; but it has been found that it is then difficult to remove, is apt to cause considerable hæmorrhage, and may cause a re-inversion of the uterus. The proper treatment is to peel off the placenta, and then to replace the uterus. After this is done the hand should be kept in the uterus until it contracts, assisting the contraction with ergot and manipulation; or hot water may be injected into the cavity; or where the woman is not too much collapsed, ice may be put on the abdomen.

Replacement is easy when done immediately, but after some time has elapsed it is very dangerous. After twenty-four hours it becomes so dangerous, because of softening, that it is better to delay replacement for some weeks. Parvin's advice is that if the uterus is relaxed and not inflamed an attempt may be made to restore it.

METHODS.—One is to attempt to replace the uterus in the same manner in which it came out, by forcing it back with one hand in the vagina, while the other presses on the abdomen.

Another is to dimple the fundus with one finger.

It is claimed by others that it is better to make the depression at the point of the entrance of the tubes.

Another method is to introduce a colpeurynter into the vagina, and to inflate it gradually. This pushes the uterus up, and has succeeded where other methods have failed.

It has happened that the os uteri has been so constricted as to cut off all circulation and cause death of the whole organ. In this case entire amputation is the only remedy. This may be done by abdominal section. When attempted it usually ends fatally, but it is the only treatment in such cases offering any hope.

**Prolapsus of the Umbilical Cord.**—This occurs once in 282 cases. This condition is where the cord projects through the os uteri, and is not



to be confounded with presentation of the cord. It occasions very little danger to the mother, but is very fatal to the child.

In later years the treatment has been very much improved.

**CAUSES.**—Velamentous insertion of the cord by bringing it down into the lower segment of the uterus, and low attachment of the placenta are causes.

Presentation of the cord is a very common cause.

One of the most frequent is a sudden gush of waters when the membranes break.

Any faulty presentation which does not fit the lower segment of the uterus, may allow the cord to fall through.

Remaining too long in the sitting or standing posture after labor has commenced, may also be a cause.

**DIAGNOSIS.**—Is made very plain by feeling pulsation in the cord, or by examining it, if necessary. In order to examine, if the cord is not in view, it is better to introduce a speculum than to pull on the cord. The only thing with which it could be confounded is prolapse of the intestine in rupture of the uterus, but this mistake could hardly be made.

**TREATMENT.**—Prolapsed cord has been replaced spontaneously, but so rarely that interference by the physician is demanded, unless the child is dead. If the child is dead, labor should be allowed to proceed as usual.

Death is easy to detect if it has existed for some time, but not so if it is recent.

Pulsation of the cord is an infallible sign of life, as it is caused by the foetal heart. But no pulsation may be felt in the cord, and still the child may be alive. It may be observed, as a general rule, that where pulsation has been absent for five minutes, death has occurred, but it must also be borne in mind that children have been born alive after it has been impossible to detect pulsation for ten or fifteen minutes. Foetal movements and the sounds of the foetal heart are also signs of life. If the child is dead, neither the woman or the child should be subjected to this operation.

*Methods of replacing.*—If the cord is prolapsed, the only treatment is to replace it.

This may be accomplished by several methods.

*Knee-chest position* is the simplest. In certain rare cases it causes the cord to slip back, and may be tried. The woman should be kept in this position until the os uteri is plugged by the presenting part.

*Replacement with the fingers* may be resorted to if position does not succeed. In this case also the cord should be held back until the presenting part engages. This very often succeeds when combined with posture.



When these methods fail, an *instrument* must be used. One for this purpose has been devised, made of hard rubber. It is not to be recommended, as it is apt to cause rupture of the uterus if a pain comes on, and it is besides very hard to introduce and to make aseptic.

*A soft catheter and a stilette* present the best method and one which is open to no objections. A piece of soft cloth is made aseptic, and is tied loosely around the cord, and the ends of it are made into a loop. This loop is passed into the eye of the catheter, and held there by inserting the stilette. The catheter is then introduced into the uterus, carrying the cord with it. If possible the cord should be hooked around one of the limbs of the child to prevent prolapsus recurring. This applies also when the fingers only are used.

The loop is then released by withdrawing the stilette, when the catheter also can be withdrawn. As both are flexible, there is no danger of injuring the parts during contraction, and it is also easy to introduce.

Should prolapsus occur again, or if the cord cannot be hooked to something to retain it in place, the catheter and stilette may be allowed to remain attached so as to hold the cord in the uterus, or they may be withdrawn, and an aseptic compress introduced to answer the same purpose. There is no risk in either of these procedures.



## CHAPTER XVII.

### MULTIPLE PREGNANCY.

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It has been said by Winckel that not more than five children can be developed in the human uterus at one time. If there are five, they will all of them be so poorly developed that none of them can live, even if born alive.

A pregnancy of five children is said to occur once in 3,500,000 cases.

Four children have been delivered in very rare cases, and under exceptional circumstances all have lived, but under ordinary circumstance none of them can be expected to live. This occurs once in about 400,000 cases.

Three children is something that is commonly seen, according to statistics occurring once in 7,820 cases, but this percentage may be regarded as rather low. It is to be presumed that with triplets all will live, as is the case with about 50%.

Twins are quite common, and occur once in 88 cases. They are always expected to live, although they are not generally so well developed as when there is only one child.

EXPLANATION OF MULTIPLE PREGNANCIES.—How a woman becomes pregnant with more than one child is explained by the collection of spermatazoa coming in contact with and fecundating more than one ovum. A certain number of scientists, who have studied the subject, think that one ovum may divide, but this is not generally held.

It is not believed that it is necessary for the impregnated ova to be developed at the same time, or that they should be fecundated at the same coitus. It is an admitted fact that a woman can conceive again up to the second month, but after one ovum has become a foetus, no more can be developed in that pregnancy.

ARRANGEMENT OF THE CHILDREN.—It is a common experience for one to present by the breech, and the other by the vertex.

One may be cross, or both may be.

Sometimes both present by the breech; more often both by the vertex.

Sometimes there are two distinct placentas and cords; sometimes there is one placenta with two cords, or there may be one placenta and one cord, which, however, divides before reaching the children.

For this reason the cord should always be tied in the manner heretofore given when treating of that subject. Five-sevenths of multiple pregnan-



cies have one placenta. In two-thirds, the sex is the same. When this is the case there is the greatest similarity in the children. This is not the case when the sex is different, and they are not alike in either markings or development.

The majority of twins are boys, being 105 in 205 cases.

**DELIVERY.**—As a rule there is no difficulty in delivery. Being not so well developed and smaller, they offer less resistance. Occasionally, however, the heads become locked. In such cases, one head should be pushed up, and this can commonly be done. But if not, the forceps should be tried, and if not successful with these, one head must be crushed. Sometimes it becomes necessary to decapitate. In all of these operations, the second child has the best chance.

*Heredity* has much to do with twin pregnancies, the tendency descending on the mother's side.

If twins have occurred once, they are more liable to occur again, but they are very rare with primipara.

**DIAGNOSIS.**—Before labor it is very difficult. The best sign is the fœtal heart sound which has been already described. Sometimes it is possible to tell by conformation, but women are often very large with one child, or with a large bag of waters.

After labor has commenced, there is very little difficulty. Sometimes a double sac can be felt or four feet. If the uterus does not contract to its usual size after delivery of one child, it should be examined to see if there is not another.

Never undertake to deliver the placenta until it is certain that there is not another child.



## CHAPTER XVIII.

### PUERPERAL HÆMORRHAGE.

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There is no department in obstetrics where a careful study is of more importance than this.

When a puerperal hæmorrhage occurs it must be controlled at once or the woman and her child may both die. There is no time for consultation, but the practitioner must depend on his own resources, and it is absolutely essential that he should be master of this subject. Much good can be done by judicious treatment timely administered, and many lives can be saved.

**DEFINITION OF THE TERM AND VARIETIES.**—Many books say that any hæmorrhage occurring during the puerperal state is a puerperal hæmorrhage. This would include effusions into the brain, lungs, etc., and would make the subject too large, and not in keeping with other definitions of puerperal diseases. So a puerperal hæmorrhage should be limited to one which not only occurs during, but is dependent upon, the puerperal state. They are divided into two classes, unavoidable and avoidable.

*Unavoidable* includes placenta prævia and certain of post-partum hæmorrhages.

**Placenta Prævia** —In this condition the placenta, instead of being attached away from the os as is usually the case, is attached in the lower zone, or third, of the uterus. It is sometimes called misplaced placenta, etc., but the best term is placenta prævia.

According to books it occurs once in 1,200 pregnancies, but it is likely that it is much more frequent. It is six times as often found in multipara as in primipara, and is more common among the poor.

**VARIETIES.**—Placenta prævia is the term applied to the attachment of the placenta in the lower zone of the uterus. When it is placed directly over the os uteri so as to cover it completely, it is called *centralis*; when it projects into the os but does not cover it, *partialis*; when it reaches down as far as the os but does not project into it, *marginalis*; when it is simply attached in the lower zone but not near the os, it is called *lateralis*.

The occurrence of placenta prævia increases in frequency in the order of the above naming.

The mortality in all cases is approximated for women one-fourth, for children three-fourths. Placenta prævia *centralis* is the most frequent



cause of death. Many of the profession call it *placenta prævia* only when it projects into the os, but this is not correct, as any of the above varieties cause unusual bleeding.

**CAUSES.**—Old cases of endometritis, catarrhal inflammation, etc., by glazing the endometrium facilitate the falling of the ovum low down. The same is true when some diseased condition has destroyed the epithelium of the endometrium.

In certain rare cases it is due to the tubes entering low down. There is no doubt but that as a woman continues to bear children she becomes more liable to this affection, and where it has occurred once it is very apt to occur again.

**SOURCE OF THE HÆMORRHAGE.**—The hæmorrhage is unavoidable. It is doubtless true that many cases end early in an abortion, so they are not entered on statistics as cases of *placenta prævia*.

The bleeding is due to separation of the placenta, and commences about the sixth month, and the tendency to bleed increases as pregnancy advances, and when the patient is finally brought to bed, bleeding is inevitable.

The explanation of this is that for the first half of pregnancy there is no placenta, and from 4½ to 6 months growth of the uterus is principally in the upper zone. But after 6 months the uterus grows in the lower zone, and growing more rapidly than the placenta, tears away from its attachments, and thus causes bleeding.

The blood comes principally from the mother, although it also comes from the child. This is proved by the fact that the woman bleeds after the child is born, and post-mortem examinations have shown that the lesions are principally in the uterus.

The placenta of *placenta prævia* is very different from normal, being quite thin and spread over a much larger surface. This is due to the fact that the lower zone of the uterus is not so richly supplied with blood, and the spreading of the placenta over a larger surface, is an effort of nature to compensate for the deficient supply of blood by taking it up from a larger area.

Although this is of great benefit to the child it makes a very serious complication. The placenta is easily torn, a portion is liable to be left behind, it is hard to detach and deliver, as, owing to the smaller amount of contraction, it does not peel so readily; and for the same reason the vessels of the uterus are not so well ligated, and continuous bleeding is liable to result.

Trouble is caused in another way also by altering the shape of the uterus, and causing an abnormal position and presentation of the child.

Bleeding is inevitable, not only because the uterus grows away from the placenta, but also because the placenta is separated by dilatation of the os.



There are certain things which accelerate, others which delay hæmorrhage. So the patient should be instructed to avoid jarring, heavy lifting, coughing, straining at stool or during urination, sewing on the machine, riding and walking. She should lead a quiet life, and as much as is practicable be in the recumbent posture.

**DIAGNOSIS.**—This is generally easy. If the placenta has once been felt it can never be mistaken for anything else. It has been said that moles might be confounded with it, but the abnormal growth of the uterus and particles of the mole coming away should prevent any difficulties.

**TREATMENT.**—The hæmorrhage may be provoked by some indiscretion, or may come on without cause or warning, sometimes in the middle of the night while the woman is in bed.

When hæmorrhage occurs early there will only be a small amount of blood lost.

If the woman is seen in the sixth month, before the child is viable, an effort should be made to tide the patient over until the child becomes viable.

Perfect rest in bed is the first essential. Opium and Black Haw should be administered to quiet the uterus, and a small pledget of cotton soaked in Monsel's solution should, if necessary, be applied to the os. This pledget is not to be used as a tampon. Placed as directed it will almost invariably stop bleeding.

If this pledget does not stop the hæmorrhage, the vagina should be tamponed, or what is better, packed tightly with small balls of absorbent cotton.

It has been said previously that under no circumstances should a tampon be used after the placenta has formed except in placenta prævia. In this case the placenta is on one side of the os and the tampon on the other, so that the space for bleeding is very limited, and the blood cannot flow into the uterus. The objection to the tampon is that it will probably bring on labor, but this cannot be helped when hæmorrhage threatens the mother's life, and is not a valid objection. Women with placenta prævia should have pledgets of cotton prepared for an emergency, and should be instructed how to use them.

**TREATMENT AFTER VIABILITY OF THE CHILD, WHEN ITS POSITION IS NORMAL.**—In this case the vagina is packed with a number of balls, filling it up tightly, and over the vulva is put a rubber bandage, to carry the balls back when they are pressed down by the child in delivery. Tamponing the vagina in this way usually brings on labor. This method of treatment is applicable to only vertex and breech cases.

Sometimes the physician sits by the side of the bed and pushes the tampons back when they are pressed down.

Finally the head or breech engages, and is born in the normal way, and the tampon is gradually expelled.



This is known as Wigan's method, and presupposes natural labor, and a not too low down attachment of the placenta.

**ABNORMAL POSITIONS.**—The tampon is used to stop the hæmorrhage, and then an assistant is gotten and arrangements made for producing podalic version. Bringing the child down into the os prevents further bleeding by plugging.

**WHERE IT IS NECESSARY TO HASTEN DELIVERY** on account of the condition of the mother, or for any other reason, the tampon method is too slow to be used. In such cases the finger should be inserted through the os, and swept around the lower segment of the uterus in order to separate the placenta from its attachments. The thin edge of the placenta should then be caught with the fingers and brought down into the vagina. The os can be dilated by the fingers at the same time. Labor is allowed to proceed normally if the head engages quickly; if not, podalic version should be produced. The separation of the placenta stops bleeding by the uterus contracting and ligating the vessels. This method stops bleeding, but is bad for the child, because it shuts off some of its nutrition, and so should not be practised if it can be avoided.

**AFTER-TREATMENT.**—The woman should be fitted with a good compress and binder, to assist in contraction of the uterus, and to hold it retracted. This expels the lochia, and also leaves less surface for absorption. The uterus should be irrigated from time to time, as the raw surface low down is apt to absorb septic matter if any be present.

The physician should remain with the woman 3 or 4 hours, instead of the usual hour and a half.

### **Separation of the Placenta Before Birth of the Child.**

This means death to the child and great danger to the mother. It may be caused by fevers and diseases of the placenta; or it may be caused by coughing, sneezing, or violence of any sort or kind.

The hæmorrhage is occult, the blood accumulating behind the child.

Well-marked symptoms of hæmorrhage are present—frequent, flickering pulse; cold, clammy skin; collapse, etc., and the uterus becomes large and doughy. An irregular and altered tumor is found in the abdomen.

**TREATMENT.**—Induce labor if it has not already begun, and in all cases complete it with either version or forceps.

### **Hæmorrhage from Rupture of the Cord.**

The cord may be twisted without danger of rupture; but sometimes the cord is so short that the child cannot be born without rupturing it or causing separation of the placenta prematurely.



The treatment is to hasten delivery as much as possible if rupture has taken place, and to ligate the end of the cord as soon as it can be gotten at. If it is found that the cord is too short, it should be cut with scissors, ligating both ends if possible.

### **Hæmorrhage from Rupture of Varicose Veins.**

Sometimes these make a bloody tumor along the canal, which will prevent labor.

The treatment is to incise; turn out the clot; deliver as quickly as possible, and then sew up, or ligate the vessel.

### **Post-Partum Hæmorrhage.**

Post-partum hæmorrhage may occur immediately after delivery—a few hours after, or six hours or more after. Those occurring before six hours are called primary, and those after, secondary.

**Primary.**—These are the most dangerous, and most frequently met with. Although it may happen when the best precautions have been taken, it is preventable in the great mass of cases.

**SYMPTOMS.**—After delivery of the placenta, should hæmorrhage occur, there is sometimes a flow of blood which is so profuse as to make a hissing noise as it passes; sometimes the bleeding is only observed when the bed-clothes become soiled, or when the blood trickles on to the floor, or when the woman feels it flowing from her, and calls attention to her condition. The pulse becomes weak, and may disappear; the face pallid and moist; the patient cannot see well or not at all; is seized with dizziness or ringing in the ears, and the extremities become cool to the touch. The hand on the abdomen feels the uterus enlarged to half its size before delivery; or even equally as large or larger. It also becomes very soft—sometimes so soft that it cannot be distinguished. It should be hard, and about the size of a croquet-ball.

**TREATMENT.**—The patient should be pulled to the edge of the bed, with her head hanging over the edge, so as to get the blood to the head, and keep alive the slight vital spark. Whiskey should be given per os or by the bowel, or hypodermically if necessary. If required, hypodermics of sulphuric ether or ammonia should also be administered. Ergot or ergotin should be injected under the skin. Most important of all the practitioner bears his arm and passes his hand into the uterine cavity, and cleanses it of all clots, membranes, and other debris. The hand is then doubled up and retained in the uterus, while the other hand kneads on the outside to stimulate it to contract on the hand in the cavity. This makes a mechanical compression, which is of great advantage.

The practitioner should be cool.



There is no cause for alarm if the uterus does not remain hard, as after hardening with contraction it sometimes becomes less so, for a limited time, while in the state of retraction. It has been suggested that compression of the aorta through the abdominal walls, or when the hand is in the uterus, would control hæmorrhage, but it has been found that this is not a practical measure, as it is apt to cause other troubles and compresses the vena cava. It has also been suggested that the uterus be grasped and bent over on its neck in order to prevent hæmorrhage. This has very little to recommend it. The fluids are retained in the uterus, and contraction and ligation of the vessels is interfered with.

But *Herman's method* of continual manual compression is of very great value. This is accomplished by inserting the entire left hand into the vagina, forcing the cervix backward, so that the anterior uterine wall rests upon the upturned palmar surface of the fist. The right hand then grasps the strongly anteverted fundus through the abdominal wall, and presses it firmly down upon the vaginal hand.

In some cases all of these efforts fail, or the uterus does not remain retracted, and it becomes necessary to use other means. The milder are used first. Vinegar may be injected into the cavity, or a peeled lemon taken by the hand into the cavity and squeezed there, or a piece of ice may be introduced into the cavity.

But the best agent that can be employed, if it can be sufficiently quickly obtained, is hot water. A stream of this, introduced into the uterine cavity, makes the uterus contract without disadvantages. The temperature should be 110° F. Anything less than this would hardly be effective. Very hot water is astringent, and does not depress. It is of the utmost importance that no air should be introduced with the syringe, as it may pass into the blood vessels, and cause death.

As a last resort another excellent remedy is tincture of iodine, one part to two, three, or four of water, injected into the cavity. Iodine, besides being astringent, is a disinfectant, and is much better than Monsel's solution, which causes a mass which is liable to afterward decompose and cause sepsis. Monsel's is excellent to stop bleeding, but for this reason should not be used, except as a last resort, as the patient may eventually die from the results of its use.

Tamponing has been advised as a last resort. A tampon, in our opinion, is not indicated; per contra, its use is considered dangerous and harmful.

Relief is given to the patient first by stimulating, and all other efforts are directed to make the uterus contract and remain retracted.

**AFTER-TREATMENT.**—This is very important. The physician should remain from two to six hours, until reaction is shown to be permanent.

McMunn's elixir can be given to quiet restlessness and stimulate; 10 drops every 3 or 4 hours.



The physician should also be prepared to inject defibrinated blood or salt solution into the veins if there are signs of collapse.

Quinine should be given, 3 to 5 grains, and repeated in 6 hours. Many practitioners give before labor to prevent shock.

The hand should be cupped and held tightly over the uterus to keep it retracted, and after it has contracted sufficiently a compress and binder should be applied tightly. This is to prevent recurrence. The compress not only holds the uterus retracted, but expels clots, etc., from the cavity and prevents absorption, and thereby risk of sepsis.

Hæmorrhages are liable to follow complicated labors, and after hæmorrhage the blood is more liable than ever to absorb foreign matter.

The patient should remain with her head low, her water should be drawn, and her bowels not allowed to strain.

She should be stimulated for effect, and given an abundance of liquid food, soups, beef tea, soft or raw eggs. Food should be administered in small quantities frequently repeated.

Bottles of hot water should be applied around the body and to the extremities.

As a rule such cases re-act quickly, and it is rare to hear of a death from primary hæmorrhage if properly treated.

The woman should be kept longer in bed, and more carefully waited upon. The vagina should be syringed out every 4 to 6 hours with antiseptic fluid. The mother should not nurse the child, but might let the baby pull on the teat to assist in contraction of the uterus.

Under such treatment a patient will almost invariably recover, and it is amazing the quantity of blood that can be lost. A quart may be lost without suffering, a pint without special discomfort; but if over a quart is lost the case is very serious, and chances are uncertain.

### Secondary Post-Partum Hæmorrhage.

These are almost always preventable; but there is no doubt about a hæmorrhagic disposition existing, which is also hereditary. Women who have bled once are more liable to bleed again. Besides heredity, it has been thought that the condition of the woman has important bearings; but plethoric and anæmic women bleed alike, except that a woman who is cachetic is more liable to bleed as she is to have any other accident.

If the patient is so predisposed, ergot should be administered in drachm doses and chloroform should be used sparingly.

CONDITIONS PROVOKING.—Inversion, polypoids, fibroid growths, tumors, etc., will cause; but these as a class are left out of consideration. With these exceptions, it is a disorder which should never occur if the patient is properly attended. It is the result of something having been



left behind, or of some accident. For the reason that such hæmorrhages are due to something being left behind, it has previously been advised to, after delivery of the placenta, disinfect the fingers and pass them to the mouth of the uterus and titillate it, and in this way cause it to expel all clots, and bring about a firm contraction.

The books say that examinations should be very infrequent, and this is true, but they should be made as often as necessary.

One condition that might deceive is placenta succenturiata. It is possible for this to be left behind, so that examination of the placenta when delivered will show no trace of it. But examination of the uterine cavity will remove all doubt.

The question of hæmorrhage caused the advice to be given that the physician should remain with the patient for one hour after delivery of the placenta.

Besides those causes of secondary hæmorrhages already given, there are others which are rare: coitus, violent emotion, leucocythæmia, Bright's disease, failure to suckle, failure of involution, etc.

TREATMENT is substantially the same as that recommended for primary hæmorrhage. Instruments may be required to cleanse the uterus.



## CHAPTER XIX.

### PUERPERAL FEVER.

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There are scarcely two text-books which teach exactly the same on this subject. The probable reason for this is that the disease assumes so many different forms, the pathology of which is dissimilar.

This terrible disease has, however, become better understood, with the result that its occurrence is much less frequent, and the mortality is considerably decreased. It is a disease which should not appear in the practice of a reputable physician if he has control of the case. It is very ancient, having been known to Hippocrates. It was for a long time thought not to be contagious, but this is no longer doubted.

CAUSES.—There have been quite a number of theories as to the cause of this disease. Inasmuch as the lochia was stopped, it has been supposed that it was due to retention of the lochia. But it is known now that the fever occurs first and the stoppage of the lochia is secondary, and is only a symptom.

It was then observed that the supply of milk was short or absent, and the retention of this was supposed to be the cause, but it is now known that this likewise is only a symptom and a result.

It was also thought to be a gastro-bilious disorder, but examination of these organs showed that they were but little affected. As it was noticed that inflammation of some sort was always a constant associate, it was thought that the fever, etc., was a result of this, but so far from the inflammation being a cause, it is often of the most beneficent character, blocking the way to further infection.

It has also been thought to be a purely blood disease as typhoid, and again that it is zymotic as erysipelas and scarlet fever.

There is no doubt that cases having come in contact with scarlet fever have a fever, a previous attack of scarlet fever not having rendered them invulnerable, but when contaminated in this way, the patient does not have scarlet, but puerperal fever. The fact that the person can be infected again is a diagnostic point between scarlet and puerperal fever. Any poison, whether that of scarlet fever or any other, may cause puerperal fever, and however varied the causes, the characteristics will be more or less common.



It has been observed that students dissecting and attending women in confinement may cause her to have puerperal fever, and it is now confirmed that cadaveric matter may provoke puerperal trouble. These conclusions embrace also the poisons of necrotic tissue.

Puerperal fever is caused by infection through a wound. A man may be present with a parturient and have infective matter on him and not cause, but if he examines the puerperal woman under such circumstances, infection is liable to occur.

In order that the woman may become infected, the poison must be absorbed into the system, and in order to be absorbed, it must pass through a wound. Wounds are always caused during delivery, although they are usually trifling. Even if there is no wound, there is always the raw surface to which the placenta was attached.

*Conclusion.*—Because of the above reasons, it is generally believed that *in order to have puerperal fever, a poison is introduced into the system from without through a wound.* It matters not what the poison is, there is something in common in all cases of puerperal fever. It is hardly possible that such absorption can take place through the lungs or skin.

Many of the poisons come from diseases of bacteriological origin. The fact that such a minute quantity may infect a woman goes to sustain the theory that it is probably due to germs, and its rapid spread, together with the additional fact that antiseptics is the best preventive known, serves to strengthen this theory. Therefore the necessity for thorough disinfection of the patient and physician with antiseptics is strongly emphasized. Persons who have dissected or handled patients with erysipelas, scarlet fever, etc., can purify themselves so as not to infect their patients, but it is sometimes impossible to accomplish this until after a number of days, even with the diligent use of the nail-brush and antiseptics. Hence many obstetrical authorities say that it requires 7 to 8 days to become thoroughly purified.

PREDISPOSING CAUSES lie chiefly in the debilitated condition of the patient. Healthy, strong women have a greater power of resistance than the weak and cachectic.

DEFINITION.—The following is by no means perfect, but will subserve the purposes of teaching: *Puerperal fever is an acute, febrile affection, heterogenetic, contagious, often epidemic or endemic, attacking women in childbed.*

*Acute.*—It attacks usually about the third day. On this day great changes take place, and the woman is in a state of susceptibility, and the milk and lochia are established, and the system is in a state of upheaval. When it occurs after 7 days the attack is more mild. After the onset the development is usually very rapid.

*Febrile.*—It never occurs without fever, and the onset is generally marked by a chill. The temperature runs from 100° to 105°, or more.



*Heterogenetic.*—Due to some external cause. The conclusion from this is that puerperal fever should and can be stamped out. The result from this is that a physician may now go for years without seeing a case when he conforms to regulations.

Retained placenta, clots, etc., decomposing in the uterus, are to be regarded as extraneous matter, as their presence in the uterus is abnormal, and of the nature of a foreign body.

*Contagious.*—This is not denied by any authority.

*Often epidemic.*—This is a weak point of the definition, as it at times is rather endemic than epidemic.

*Attacking women in childbed.*—It cannot affect anybody except a parturient. A man or child cannot contract it. Nurses, doctors, and attendants have become affected by it, and have died of blood poison, but such cases have not the character or marks of puerperal fever.

There is one form of puerperal fever which resembles blood poison and nothing else. Such cases develop in a few hours, and die in one day. Such women have no power of resistance, or are overwhelmingly poisoned.

#### VARIOUS FORMS.

**Phlegmasia alba dolens.**—This is often one of the milder forms, as the system reacts so quickly as to usually be able to throw off the disease, but it may be one of the most severe.

It is caused by the introduction of the poison into the veins of the leg, where it clots the blood and closes the lumen. It is a conservative measure, protecting the general system from absorption. The condition produced is called a thrombosis. A thrombosis is a coagulation of blood which remains fixed and permanent where it coagulates. If it is made to travel, it becomes an embolism. As a thrombus, phlegmasia alba dolens is not innocent, but comparatively so; but if it becomes broken up into emboli, the entire system will become affected.

It occurs in the veins because that blood is the most impure, and, therefore, least resistant, and also because the veins absorb as do the lymphatics.

The blood in the veins of the leg being coagulated and fixed, it is important to keep it so. The leg should not be rubbed, as the clots may become dislodged, and create a dangerous condition, but should be bandaged in cotton and kept slightly elevated, and as quiet as possible. It generally attacks only one leg at a time, and if one only is attacked, it is usually the left.

*There are two forms—mild and severe.*

**MILD.**—In the mild form the blood becomes coagulated in the veins, and when recovery takes place either the vein is reduced to a cord by the blood organizing, or the blood undergoes a fatty degeneration that is not



poisonous, and is absorbed, the tube becoming again patulous, and circulation is carried on as before. In the first case circulation must be carried on by collateral branches.

**SYMPTOMS.**—It rarely sets in before several days, when there is a rigor, followed by fever as much as  $103^{\circ}$  or  $104^{\circ}$ . If continuous rigors and fever occur, it shows that the disease is extending. The leg becomes swollen and motionless, and the foot is everted. The glistening white color gave the name of milk leg to it by the laity. If the skin is punctured, there is an exudation which remains where it is, and coagulates. If the skin is pitted with the finger, the pit disappears on removal of pressure.

In this simple form these symptoms last for a week or ten days, and then for about that length of time gradually subside, but the wise physician will always tell his patient that she will be sick for 40 to 60 days. If recovery takes place in less time than that, there is no harm done, but it often lasts that long.

**TREATMENT.**—Prevent all rubbing. Bandage the leg in absorbent cotton, and keep it perfectly quiet. If there are signs of too great tension, leeches may be applied as required. Ordinarily, it is sufficient to bind up the leg as directed, using oiled silk on the outside, and placing a pad under the knee and one on either side of the leg to prevent eversion. The patient should be purged with calomel and soda, calomel and jalap, or calomel and rhubarb. If it is thought best not to use mercury, 15 grains of jalap and 10 grains of scammony can be used.

Quinine in 5-grain doses should be given every 3, 4, or 5 hours as indicated. If the patient is vigorous, phenacetin can be used.

When convalescence commences, it is hastened by the use of nitromuriatic acid, or one of the other mineral acids.

When the patient is debilitated, stimulants should be given at first, and later iron.

The patient under no condition should leave her bed until the swelling and pain have entirely subsided. After these have entirely disappeared, she can be allowed to go from the bed to the sofa for one week; the next to sit up in a chair, and then to move cautiously about the room, gradually increasing the amount of exercise until it reaches the normal point.

**SEVERE.**—This form tends to go on to a destructive inflammation. The clot, instead of organizing or going on to a fatty degeneration, becomes purulent, and is absorbed into the system, causing infection of distant organs and hectic fever, the patient dying of blood poison. It usually ends in death.

**TREATMENT.**—So far as the leg is concerned, it should at first be treated in the same manner as in the mild form. Abscesses occurring at any point should be freely opened as soon as detected. These are often located in such a manner as to be fatal in themselves.



Stimulation and nutrition should be pushed boldly, and large doses of iron given, as it affords the only chance for life.

**Lymphangitis.**—This occurs most commonly in connection with phlebitis. Not only are the lymph vessels affected, becoming greatly swollen, but the glands likewise become greatly inflamed and swollen, and both may undergo the same degenerations spoken of in connection with the veins, and may even become gangrenous.

TREATMENT is substantially the same as for phlebitis.

Abscesses should be watched for, and opened as soon as formed.

**The Vagina, Uterus, Tubes, or Rectum** may be attacked by the inflammation, which may be mild or severe. In mild cases a so-called fibrous wall is formed preventing other infection; in severe cases the inflammation runs a destructive course, and the general system is attacked.

From these parts it may pass to adjacent parts, causing septic peritonitis, salpingitis, etc.

The treatment should always be local use of antiseptic fluids, where possible, on the parts affected; and treatment of the general system by stimulants, nutrition, and tonics, as indicated.

**Peritonitis.**—Usually this does not appear until after several days.

The pain in the abdomen is intense, so severe that the weight of a sheet cannot be borne. There is paralysis of the muscular coat of the bowels, and gas collects, causing tympanites, and adding greatly to the pain. Vomiting of greenish fluid and loose diarrhoeal discharges occur.

Sometimes the cellular tissue is involved, forming little pockets of pus. These should be opened as soon as found. They open sometimes under Poupart's ligament, through the abdominal wall, into the bladder, rectum, etc. Opening should be at once, without waiting for the abscess to point. Even when there is no pus, swellings can at times be detected around the uterus which push it to one side.

Under these circumstances there is always an arrest of involution of the uterus.

TREATMENT.—It is generally considered best to open treatment with a cathartic, and mercury is perhaps the best, and is coming to be used more and more. It is a good cathartic, relieves the engorged liver, and is thought also to be germicidal.

After using mercury, if necessary, in large doses, opium or morphine should be administered in sufficient quantity to absolutely control the pain.

For the tympanites turpentine may be administered per orem in doses from gtt. x to xx, t. i. d. Sometimes it is used in larger quantity by enema. Locally turpentine stupes on the abdomen are of the greatest benefit. In place of turpentine per orem some of the other oils may be used, as oil of cajeput, gaultheria, etc., or carbolic acid or creasote in gtt. 1 doses, or sodium sulphite in gr. xx doses.



Great relief may sometimes be afforded by evacuating the gas with a long rectal tube.

Puncture of the intestine through the abdominal wall with a small trochar has been practised, but is dangerous.

**Zymotic Diseases.**—If the patient has not had one of the zymotic diseases and is exposed to it, she will have the disease with its rash, but if she has been rendered immune by a former attack, if she is affected she may develop some form of puerperal fever.

**Septicæmia.**—Generally when the blood is affected the system does not resist. In this condition the fever commences on the 1st or 2d day, while in the other forms it sets in from the 3d to the 5th day, and when the veins and absorbents are attacked not until the 7th to 14th day. The further off from delivery the attack commences the better are the chances of the patient, and if attacked after the 7th day the rule is recovery.

In septicæmia the system is as a rule overwhelmed, and the usual prognosis is death.

*General rules in general cases.*

Whatever form the disease may have assumed, the parturient canal should always be examined and the lesion located.

All foreign matter should be thoroughly removed, and the uterus and vagina irrigated with antiseptic solutions. Bichloride is the best for this purpose, and it was formerly used in the strength of 1:1000, but many patients so treated died. 1:2000 was then used, but 1:5000 is considered amply sufficient, and the disposition is to make it still weaker, it having been proved that bacteria cannot live in 1:10000. If bichloride is contra-indicated by serious kidney disease carbolic acid may be used 1:80.

For irrigating the uterus, Chamberlayne's glass tubes are recommended. The opening into the sides of the tubes should be equal in calibre to that of the tube to make the return easy and prevent the liability of the fluid being forced through into the tubes. The whole of the apparatus should be filled with water before inserting to guard against introduction of air. The glass tubes have the advantage of being cheap, and can be broken up after being used. Metal tubes are used, but are not so good for these reasons.

If a catheter is required, it is better of glass, and should never be used on another patient.

Irrigation should be practised as often and continued as long as indicated.

If irrigation has been used for 2 or 3 days without benefit, it should be discontinued.

There is a new treatment which promises even better success than irrigation. This consists in curetting the womb with a blunt instrument, irrigating, and packing loosely with iodoform gauze. The gauze furnishes



an excellent medium for carrying off the impure matters. This treatment is recent, but is very successful, and is likely to supplant irrigation alone. The packing is renewed as indicated by the amount of discharge.

Locally counter irritation by turpentine stupes or blisters is of great value.

Pain should be controlled by opium or morphine.

The Germans have advocated the use of cold locally, and reduction of temperature by cold sponging or bath, but the tendency to depression which already exists, it is thought, prevents this treatment from being generally adopted.

Treatment of the general system is of the utmost importance. Stimulation should be pushed boldly. The internal administration of hyposulphites and other antiseptics has been practised but with small success.

Above all prophylaxis in treating cases of confinement should be thoroughly carried out. A case should never be attended immediately after attending a case from which infection may be carried. The accoucheur, all instruments, dressings, and utensils should be perfectly aseptic. The external parts should be bathed with an antiseptic solution, and, if practicable, the patient should be given a warm bath before being confined.

The injection of blood serum for the relief of this disorder is at this writing still in the domain of Experimental Medicine.

*Puerperal fever is considered a preventable disease, and this fact should never be lost sight of.*



## CHAPTER XX.

### EXTRA-UTERINE PREGNANCY.

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*Synonyms:* Ectopic gestation, extra-uterine fœtation.

This is an extremely interesting condition which was formerly thought to be rare, but in the light of modern research is now considered comparatively frequent. These names are applied to those cases in which the ovum develops outside of the uterine cavity.

Owing to the fact that many of these cases are not detected, and others are diagnosed as some other affection, it has not been possible to secure accurate statistics of its frequency, but the most recent figures given are that it probably occurs once in four to five hundred cases.

**CAUSES.**—While other causes have been considered as accounting for extra-uterine pregnancy, the true cause, it is thought, lies in some *pathological condition or malformation of the Fallopian tube*.

The pathological conditions are usually the result of a salpingitis, either catarrhal or gonorrhœal.

These in the first place destroy the ciliated epithelia of the tube, which normally propel the ovum to the uterus, and, by causing more or less hyperplasia of the tissues of the tube, interfere with its peristaltic action.

In addition, peritoneal adhesions and abdominal tumifactions may so constrict the tube as to almost destroy its lumen, or may so distort it as to cause pockets into which the ovum may fall, or the lumen may be obstructed by a mucous polypus. Knuckling, congenital stenosis, diverticula, blind accessory tubes may, in rare cases, be the cause of extra-uterine pregnancy.

**VARIETIES.**—The following classification has been selected as the most satisfactory:

1. Tubal pregnancy, including—
  - (a) Interstitial, mural, or tubo-uterine.
  - (b) Tubal pregnancy proper, including intra-peritoneal, intra-ligamentous, and extra-peritoneal.
  - (c) Tubo-ovarian.
2. Ovarian pregnancy (exceedingly rare).
3. Abdominal pregnancy, including—
  - (a) Primary.
  - (b) Secondary, resulting from rupture of some other form.

It is claimed by certain eminent authorities that ectopic pregnancy is always primarily tubal, but this has not been proven.



## PATHOLOGY OF THE DIFFERENT FORMS.

*Interstitial pregnancy.*—This variety of extra-uterine pregnancy occurs when the ovum develops in that portion of the tube which passes through the uterine wall.

As the ovum develops, its sac projects from the lateral and upper aspect of the uterus, the inner portion of the sac being formed by the hypertrophied muscular tissue of the uterus, while the outer portion is formed by the walls of the tube and the broad ligament.

After the ovum has grown for a short while, it outgrows its lodgment in the uterine portion, and early rupture into the abdominal cavity usually ends the gestation.

If, however, the growth be toward the uterine cavity, rupture may take place into the cavity, and the gestation end as if it were a uterine abortion. (Rare.)

*Tubal pregnancy proper.*—This variety is by far the most frequent. The ovum is arrested somewhere in the tube, usually at the junction of the outer with the middle third. As the ovum develops, the tube is dilated, and at the same time an hypertrophy of its muscular wall occurs. This hypertrophy is not uniform, but leaves certain thinned spots which are usually the sites of rupture.

Immediately around the ovum are formed the amnion and chorion, the latter containing villi as usual, while the decidua is formed from the tubal mucosa. This does not form a true decidua, neither is a true placenta usually found.

*Growth* may take place in two directions: *upward* into the abdominal cavity, and *downward* between the folds of the broad ligament.

*Growth upward* usually ends in early rupture, but may continue until late in pregnancy.

*Growth downward* may end in early rupture, but as the sac is strengthened by the broad ligament, it is possible for this variety to be carried to term.

All of these varieties are apt to cause serious complications by adhesions to and pressure on the various organs.

*Tubo-ovarian pregnancy.*—This occurs when the ovum becomes attached to both the ovary and the Fallopian tube, and is developed between the tubal fimbriæ.

This variety usually ends in early rupture, but development occasionally takes place downward between the meshes of the broad ligament, in which case some authorities teach the pregnancy may be carried to term.

*Ovarian pregnancy.*—This is extremely rare, but has been demonstrated to occur. The ovum develops within the ovary. Its explanation is difficult. The termination is usually in early rupture, but some authorities teach that pregnancy may be carried to term.



*Primary abdominal pregnancy.*—This occurs when the ovum escapes into the free abdominal cavity and becomes fecundated and develops there. It is extremely rare. The ovum, not finding a suitable place for attachment, drops either into one of the iliac fossæ or into Douglas' cul de sac, or becomes attached higher up among the intestines, and develops there.

The foetal structures become well developed, including the placenta, and pregnancy may continue to term without rupture. The sac is formed from the exudate thrown out by the peritoneum.

*Secondary abdominal pregnancy.*—This results from the rupture of some other form of extra-uterine pregnancy, or, in very rare cases, from rupture of a uterine pregnancy caused by a fistula from a Cæsarian section or former rupture of the uterus.

Death of the embryo usually follows rupture, but death may not occur, and pregnancy may advance to term. When the embryo is expelled by rupture the placenta may be expelled with it, or it may remain attached at its original site.

**SYMPTOMS OF EXTRA-UTERINE PREGNANCY.**—These may be divided into those common to all forms of extra-uterine pregnancy, and those peculiar to the different forms.

*Symptoms common to all forms.*—The same reflex phenomena will be observed as in regular pregnancy. The nausea and vomiting are usually more pronounced, and begin quite early. The mammary changes are the same, and the same constipation results, often accompanied by a very annoying tenesmus.

Extra-uterine pregnancy usually occurs after a more or less protracted period of sterility, which is marked by symptoms of endometritis. There is usually an arrest of menstruation for one or two periods, except in primary abdominal pregnancy, when menstruation is often very little disturbed. Return of the menstrual flow or of a sanguinolent discharge usually indicates death of the embryo and presages early rupture.

The most prominent symptoms are those arising from pressure, œdema of the leg on the same side, and especially severe, lancinating, cramp like pains, originating at the affected point and radiating down the leg and to the sacral region.

There is often some elevation of temperature, especially in nervous women, and about the time of rupture.

*Symptoms peculiar to different forms.*—These are usually to be made out by examination. The usual changes in the vagina and uterus take place, but the uterus is not enlarged in proportion to the duration of pregnancy, and instead of being strongly anteverted as is usually the case, is pushed to one side.

In the case of *tubal pregnancy* a round, tense tumor will be found on



one side or behind the uterus which is very sensitive and gives a peculiar elastic sensation to the finger, or it may give a well-marked fluctuation.

*Interstitial pregnancy* is marked by an increased size of the uterus; that is, it is larger than in simple tubal pregnancy. *Ovarian pregnancy* offers no signs different from tubal pregnancy. In *abdominal pregnancy* the uterus is enlarged very slightly or not at all, and a large tumor will be found near the uterus, irregular in shape. Later on the foetal parts can be palpated through the abdominal wall.

**DIAGNOSIS.**—While this may always be possible before rupture, it is extremely difficult. The following symptoms, when taken together, make a very probable diagnosis:

There is the history of the signs of early pregnancy, accompanied by a rapid development of the reflex symptoms in an aggravated form. There is usually a history of sterility marked by symptoms of endometritis, and followed by cessation of menses or irregularity of menstruation, which is in turn followed by a return of menstruation about the second or third month, but in an irregular manner. A sensitive tumor can be felt near to the uterus, and the uterus is very slightly developed beyond normal. A false decidua is formed in the uterus, which is expelled usually about the time of rupture. It may come away in piece-meal, but sometimes comes away entire, presenting a cast of the uterus.

There are several pathological conditions which closely simulate extra-uterine pregnancy—namely, cornual pregnancy, pyo-salpinx, normal pregnancy complicated by a fibroid tumor on one side of the uterus.

Rupture usually clears up the diagnosis.

#### SYMPTOMS AND DIAGNOSIS OF RUPTURE.

For a few days before rupture, a sanguinolent discharge will be noticed from the vagina, which gradually increases, and contains débris and shreds of the uterine decidua. Rupture may occur while straining at stool or while lifting, etc.; and again, may occur during the night while the patient is in bed.

She will be seized with a violent, cramp-like pain, and, if standing, may fall to the floor in collapse.

Symptoms of internal hæmorrhage will quickly appear; fainting, sighing respiration, clamminess of the skin, feeble, running pulse, increasing pallor, etc. The vaginal discharge increases, and may contain large masses of false decidua from the uterus. If the hæmorrhage continues, the patient will become pulseless, and even completely exsanguinated.

If the rupture is intra-ligamentous, a large tumor will be suddenly developed at that site, which can be palpated through the vagina.

Rupture may occur in two directions—either into the free abdominal cavity, or into the broad ligament. In the former case, the hæmorrhage



is usually unlimited, and the symptoms dependent upon it are more pronounced, but the contrary may be the case.

The following conditions may simulate *intra-peritoneal rupture*: Abortion, dysmenorrhœa, rupture of some abdominal organ, as rupture of the appendix, pelvic peritonitis.

The following may simulate *extra-peritoneal or intra-ligamentous rupture*: Intra-peritoneal rupture, hæmatoma of the broad ligament, exudate into the broad ligament, cyst or abscess of the broad ligament.

PROGNOSIS.—Extra-uterine pregnancy ends in one of three ways: rupture, death of the product of conception, or continuance of the pregnancy to term.

When rupture occurs, it takes place usually from the 10th to 12th week. It seems to be due to the tube being stretched to its fullest extent. The length of time that a woman may survive after rupture depends on the amount of hæmorrhage; usually it is from 8 to 20 hours.

Death of the product of conception, when it occurs prior to twelve weeks, generally causes a cessation of the signs of pregnancy, with absorption of the sac with its contents, resulting in spontaneous cure. If death occurs subsequent to this time, absorption of the liquor amnii alone takes place, while the fœtus undergoes a process of degeneration, or the entire sac may be converted into an abscess cavity. Either one of these subjects the woman to grave consequences—the former by ulceration, etc., the latter by the imminent danger of rupture, with resulting peritonitis, fecal fistulæ, etc.

Continuance of the pregnancy to term takes place very rarely. The woman falls in labor at the end of term, and as the pains are ineffectual they gradually cease and the fœtus dies from placental separation.

Extra-uterine pregnancy is perhaps the gravest condition to which a pregnant woman may fall heir. Hæmorrhage is acknowledged to be the chief source of danger. The mortality in untreated cases is about 66 $\frac{2}{3}$  per cent., the 33 $\frac{1}{3}$  per cent. of recoveries being entirely due to spontaneous cure already mentioned.

If the cases are treated by operation, either before rupture or immediately after, the mortality is reduced to about 5 per cent.

TREATMENT.—After a diagnosis of extra-uterine pregnancy has been made, the best treatment, in our opinion, is immediate operation. It has been advised to attempt to arrest the growth of the embryo by means of electricity, when the case is seen prior to the time for rupture, and this treatment has been much used, but in recent years has been, practically speaking, abandoned. It never has been and never can be perfect in its results.

Other methods, all looking to killing the fœtus, have been from time to time proposed and submitted to clinical tests. They have all, however,



proven more or less satisfactory. Operation offers the best and most certain results.

If the operation is performed before rupture, it is comparatively simple; if performed during the later months of gestation, it is apt to be complicated by extensive peritoneal adhesions.

Rupture always demands prompt operation. If the patient is much exsanguinated, injections of normal saline solution should be practised. This is preferably done by intravenous injection, but it may be injected into the cellular tissue of the buttock or elsewhere, or by enema into the rectum.

The operation is performed in the same manner as other laparatomies with certain modifications due to the obstetrical nature of the case. It is not within the scope of these notes to describe it in detail.

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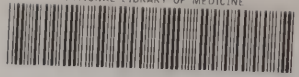








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